ASSESSING INFLUENCES ON THE MEDICATION MANAGEMENT STRATEGIES OF OLDER ADULTS WITH HYPERTENSION

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ASSESSING INFLUENCES ON THE MEDICATION MANAGEMENT STRATEGIES OF OLDER ADULTS WITH HYPERTENSION

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SUMMARY

Many older adults are living with at least one chronic disease and must adhere to prescribed medications to control the impact of these diseases. Most common is hypertension, a mostly asymptomatic disease in which one's blood pressure is elevated in comparison to healthy levels. Thus, there may not be symptoms to remind one to take their daily medication and, as older adults may experience declines in some forms of memory as they age, these individuals may face challenges in properly adhering to their prescribed antihypertensive medications. Multiple factors (e.g., illness representations, goals, control beliefs) influence the strategies older adults employ to ensure the successful management of their medication, helping to control their blood pressure. However, more research is needed to better understand the factors that influence the utilization and effectiveness of these strategies.

The goal of the current study was to understand how older adults approached the management of their antihypertensive medication as well as the factors that influence this management. A semi-structured interview was performed to obtain in-depth information regarding the medication management strategies and opinions of individuals aged 65-85 who have been diagnosed with hypertension. Participants, on average, expressed using, on average, approximately 4 strategies in their medication management routines. The association strategy was found to be the most commonly endorsed as well as perceived as the most effective. In addition to strategy use, misconceptions regarding individuals' knowledge of the disease, as well as incongruities between self-reported adherence and participants' perceived medication management ability, were evident in the interview data.

These findings inform our theoretical understanding of how older adults approach managing their antihypertensive medication as well as what might be contributing to the difficulties that individuals diagnosed with the disease have experienced regarding its management. Additionally, these findings inform the design of more effective tools geared toward improving and maintaining antihypertensive medication adherence (e.g., interventions, hardware/software applications).

CHAPTER 1. INTRODUCTION

1.1 The Burden of Hypertension for Older Adults

People are, on average, living longer than ever before as the impact of acute health-related issues has been reduced by various medical and technological advancements (National Institute on Aging, 2011). However, with this increased life expectancy, the prevalence of chronic diseases has become an issue of rising importance. Although many definitions exist of what constitutes a chronic disease (for review, see Goodman, 2013), these diseases generally have a prolonged duration (i.e., multiple years to a lifetime), a slow progression, and require consistent management to reduce the possibility of potentially harmful effects that may lead to further health impairments, a decrease in quality of life, or even premature death. Many people are diagnosed with chronic diseases in their lifetime as about 50% of American adults have at least one such disease (Ward, Schiller, & Goodman, 2014), and the prevalence of these diseases increases with age (Wolff, Starfield, & Anderson, 2002). It is estimated that 92% of older adults (≥ 65 years) are managing at least one chronic condition, and about 77% have multiple conditions (National Council on Aging, 2014).

According to the World Health Organization (2008), chronic high blood pressure, more commonly known as hypertension, is one of the most prevalent chronic diseases around the world and has been defined as a "disease in which blood flows through blood vessels at higher than normal pressures" (i.e., ≥ 140/90 mmHg; National Heart, Lung, and Blood Institute, 2015). The prolonged effects of untreated hypertension can be very serious as the condition may lead to heart disease, stroke, and other issues related to deteriorating health and premature death (Kung & Xu, 2015).

Moreover, hypertension has been found to primarily affect older adults. In the United States, it is the most common chronic disease for this population as nearly 70% of adults over the age of 65 are currently classified as hypertensive (American Heart Association, 2013; Federal Interagency Forum on Aging-Related Statistics, 2010). Of those with hypertension, only about half have it properly controlled (Nwankwo, Yoon, Burt, & Gu, 2013). A unique characteristic of this disease is that it is mostly asymptomatic, meaning it does not usually cause any perceptible physiological symptoms, and this may contribute to the difficulty experienced in properly managing it. This has led many to refer to the disease as a "silent killer," and is in contrast to the recognizable symptoms of other diseases that older adults may experience such as the stiffness and pain associated with osteoarthritis, or the lightheadedness and anxiety experienced by those with hypoglycemia due to diabetes.

Although hypertension is a primarily asymptomatic disease, it should be noted that there are some relatively rare circumstances in which elevated blood pressure may be accompanied by symptoms. For example, an individual experiencing a hypertensive crisis (i.e., a blood pressure reading of 180/110 or higher) might experience severe headaches, vomiting, anxiety, among other potential symptoms. As these hypertensive crises are related to a sharp increase in one's blood pressure to dangerous levels, these individuals are advised to immediately seek medical attention as the effects of prolonged exposure to such pressures may lead to stroke, loss of consciousness, kidney damage, as well as other serious consequences (American Heart Association, 2016). Nevertheless, most individuals living with the disease do not experience these acute rises in blood pressure and the disease for them is asymptomatic.

1.2 The Importance of Successful Antihypertensive Medication Adherence

The asymptomatic nature of hypertension may be a significant influence on adherence to prescribed antihypertensive medications as about half of all new patients discontinue taking their medication within one year (Vrijens, Vincze, Kristanto, Urquhart, & Burnier, 2008). Thus, proper management of the disease has become a serious issue facing those diagnosed with it, and this issue may be amplified for older adults who may be less likely to engage in proper self-management behaviors due to a variety of cognitive, emotional, or physical factors (e.g., Lin et al., 2004; Park, Willis, Morrow, Diehl, & Gaines, 1994).

Older adults' adherence to their antihypertensive medication is especially important as prescribed medications are generally the primary defense one has when diagnosed with a chronic disease (secondary defenses include improved diet, increased physical activity, among others). Medication adherence, defined as "whether patients take their medications as prescribed…as well as whether they continue to take a prescribed medication," is a vital factor in positive patient outcomes (Ho, Bryson, & Rumsfeld, 2009, p. 3028), and maintaining successful adherence has been shown to involve the interaction of multiple factors (Morrell, Park, Kidder, & Martin, 1997). Moreover, nonadherence to these regimens may be costly to older adults in a variety of ways such as the financial impact concerning the need for future health care and with regard to their overall quality of life (Hughes, 2004).

As older adults may experience measurable declines in some forms of memory as they age (e.g., prospective memory, source memory, working memory; Henry, MacLeod, Phillips, & Crawford, 2004; Luo & Craik, 2008; Raz, 2000; Salthouse & Babcock, 1991), they may also subjectively believe that their memory ability has decreased. For instance, various studies have found that older adults possess generally negative expectations regarding the relationship between

memory performance and increasing age (e.g., Ryan, 1992). These objective and perceived memory difficulties, in combination with the consequences of forgetting to take one's prescribed medication, portray the importance of utilizing strategies to compensate for declines and increase the likelihood that medication adherence is properly achieved. Thus, understanding how older adults attempt to strategically manage their medications and what factors may influence these strategic behaviors is an issue of significance and ever-increasing importance, especially for a highly prevalent disease such as hypertension.

1.3 Medication Management Strategies and Their Influences

The use of medication management strategies may aid an older adult to achieve proper adherence, and these strategies may even be combined to further ensure their effectiveness. For example, one study assessed the strategic behaviors that 354 older adults used to take their medications by providing seven common strategies extracted from the relevant literature (Boron, Rogers, & Fisk, 2013). Ordered by frequency of endorsement, these strategies were: location, visibility, association, pill caddy, mental planning, physical pain, and external reminders. Evidence for the endorsement of multiple strategies by the older adult participants was also found, as well as the fact that, when asked about their medication management, 71% of participants who previously stated they did not use any specific strategies then endorsed at least one of the presented strategies.

Boron et al. (2013) assessed the medication adherence strategies of older adults without controlling for any specific disease. Thus, the results may not be generalizable to an asymptomatic disease such as hypertension. However, one study evaluated the medication management strategies endorsed by a sample of middle-aged and older adults (M = 63.7 years) with cardiovascular disease (primarily hypertension; Kripalani, Gatti, & Jacobson, 2010). Participants primarily reported using

an association strategy (taking medication with meals or events), followed by the use of a pill organizer, and reliance on friends or family for reminders. About half of participants endorsed multiple strategies, a similar finding to Boron and colleagues (2013), and individual characteristics (e.g. age, ethnicity) were not found to significantly correlate with any specific strategies. No strategies were found to positively relate to adherence, although one was found to hold a negative association (reliance on others).

The successful use of such strategies in combination with one's motivation to control the disease may be central in ensuring long-term adherence (Brown, Bartholomew, & Naik, 2007; Hughes, 2004). Although the topic of medication adherence regarding hypertension has been one of interest by researchers in past decades (e.g., Burnier, 2006; Ho et al., 2009; Krousel-Wood, Thomas, Muntner, & Morisky, 2004), adherence issues among these older adults persist and, thus, there exists a need to gain a better and more complete understanding of not only the strategies they endorse, but also the factors that may impact the effectiveness of these strategies. For instance, the previously mentioned study performed by Kripalani and colleagues (2010) only investigated the association of age and health literacy with endorsed strategies, but other factors may play significant roles as well. Such influences may consist of one's illness representation, knowledge, goals, control beliefs, among others.

1.3.1 Illness Representation

An individual's internal representation of a chronic disease such as hypertension plays a critical role in their ability to manage their medication (Petrie & Weinman, 2006) and this representation may influence the strategies they employ to do so. To explain these internalizations, it is beneficial to clarify the difference between two commonly used terms in this space: disease and illness. A disease refers to "the named pathological entities that make up the medical model

of ill-health…and which can be specifically identified and described by reference to certain biological, chemical or other evidence," whereas an illness generally refers to "the patient's perspective on his [sic] ill-health, a perspective which is very different from that of the disease model" (Helman, 1981, pp. 548-49). In other words, an illness is the patient's internalization of the disease with which they have been diagnosed.

Various health behavior models have been proposed to better understand how these internalizations may influence the attitudes, behaviors, and beliefs relevant to managing one's wellness (Leventhal, Nerenz, & Steele, 1984; Prentice-Dunn & Rogers, 1986; Rosenstock, 1974; Schwarzer, Lippke, & Luszczynska, 2011; for a review, see Abraham & Sheeran, 2000; also see Redding, Rossi, Rossi, Velicer, & Prochaska, 2000). One such model, the Common Sense Model of Illness Representation (also referred to as the illness representation model) developed by Leventhal and colleagues (1984), proposed five cognitive components related to how older adults internalize a disease and form their personal illness representation. These include the identity of the illness and its symptoms, the perceived causes of the illness, the consequences of having the illness, the timeline of the illness and its symptoms, and the perceived sense of control one has in managing the illness (for a meta-analytic review of the model, see Hagger & Orbell, 2003; for diagram of the model, see Figure 1). Leventhal et al. (1984) proposed that the illness representation these components comprise may lead to various coping strategies and styles (e.g., avoidance/denial, cognitive reappraisal), and these coping strategies then contribute to one's illness outcome as well as an appraisal of the coping strategies' effectiveness. These components then feed back into one's internalization of the illness. However, the model does not include the medication management strategies that one utilizes to attempt to control the illness which may be important as these behaviors may impact this internalization as well as the illness outcome (Hale, Treharne, & Kitas, 2007).

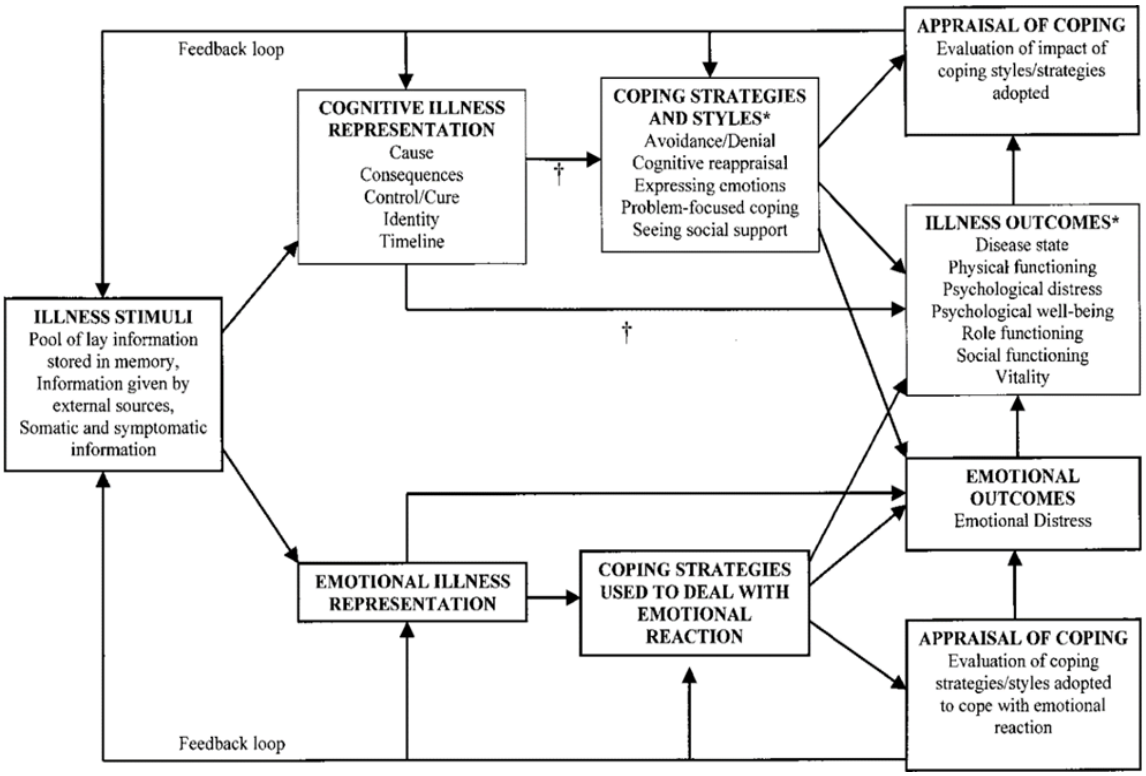

Figure 1. The Common Sense Model of Illness Representation, as diagrammed by Hagger & Orbell (2003).

The amount or quality of information an older adult has internalized regarding hypertension may impact the likelihood that they participate in appropriate management behaviors. For example, a positive relationship was found between the duration that one has been diagnosed with hypertension and the amount of knowledge they possess about it, as well as between the amount of knowledge one has about the disease and their sense of control in managing it (Chin et al., 2009). Similarly, an example of the impact that misinformation may have on one's ability to successfully manage the disease was presented by Meyer, Leventhal, and Gutmann (1985), who asserted that despite the fact that nearly 80% of participants in one study expressed that they understood that people are unaware when their blood pressure is elevated, about 90% of those participants believed that they were still able to notice when they were personally experiencing high blood pressure, regardless of its asymptomatic nature. The cognitive inconsistency portrayed

by this finding may influence the actions one may take to properly adhere to their medication. Findings such as these represent why it is imperative to gain a better understanding of how individuals are internalizing information regarding their illnesses and how the quality and detail of this information may influence their self-management behaviors.

Morrell and colleagues (1997) performed a study involving adults (*M* = 59.5 years) who had been diagnosed with hypertension and also found evidence that these internal self-management beliefs may impact adherence rates. In sum, how one internalizes their illness and the behaviors relevant to its management, such as taking prescribed medications, might influence the degree of success in reaching positive health outcomes as well as successfully managing hypertension through the use of medication management strategies.

1.3.2 Goals

The goals set by an older adult regarding the management of their hypertension generally and their medication specifically may influence the strategies they utilize to reach them. For example, having more structured goals may increase the likelihood that one will intentionally perform the actions necessary to reach them (Gollwitzer & Sheeran, 2006). Brown and colleagues (2007) found that older men (*M* = 70.1 years) lacked explicit goals concerning the management of their high blood pressure despite their awareness of the long-term consequences of failing to manage the disease. These participants' goals also generally lacked any temporal variable, with most failing to set any personal deadlines by which they desired to achieve their blood pressure goals. The results of this study led to the creation of a sample-specific framework regarding goal setting for hypertension control (see Figure 2). The framework describes the relation between

possible determinants, goals and activities, and the eventual impact these characteristics may have on health outcomes related to hypertension management.

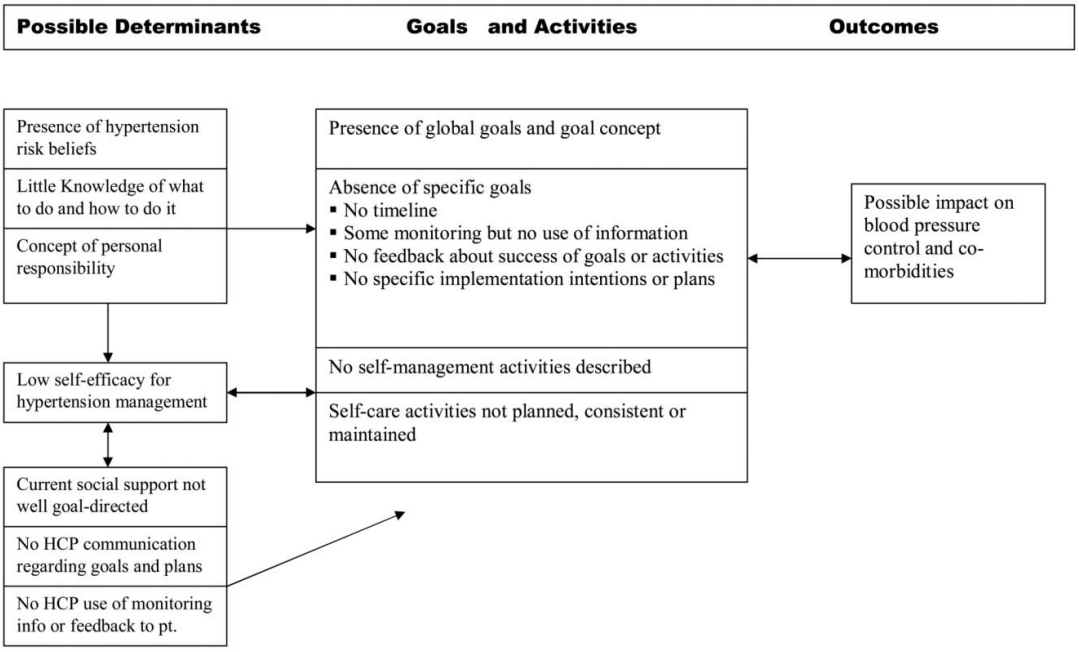

Figure 2. Framework and characteristics of goal setting for hypertension control among older comorbid male veterans, as presented by Brown and colleagues (2007).

Understanding whether adherence to one's antihypertensive medication is a primary and detailed goal may be of importance to whether an older adult strives to control their hypertension. For instance, if an older adult who has been diagnosed with hypertension internalizes goals of high specificity relevant to ensuring continuous adherence to their prescribed medications, the characteristics and heightened activation of this goal may influence whether they engage in self-management behaviors as well as their ability to recover from any interferences that could threaten the execution of their goal-directed health behavior (e.g., Altmann & Trafton, 2002). Thus, a better understanding of how older adults with hypertension currently approach setting goals relevant to self-management as well as the obstacles they face when doing so may hold the potential to

improve the effectiveness and consistency of strategic behaviors for medication adherence (Brown et al., 2007).

1.3.3 Control Beliefs

An older adult's belief about whether control of their hypertension is dependent on internal or external variables, or simply due to chance, holds the potential to influence medication management behaviors. The orientation of such a belief defines one's health locus of control. Generally, older adults tend to possess a more external health locus of control than younger adults, meaning that they may not feel that they have control over the outcomes related to their health (Lachman, 1986). This external health locus of control may then impact their well-being over time as they may be less likely to adopt healthy, preventative, or self-managing behaviors such as eating well, exercising, or implementing proper strategies and setting long-term goals related to their well-being (Janz & Becker, 1984; Lachman, 2006). For example, a study performed by McDonald-Miszczak, Maki, and Gould (2000) presented evidence for a positive relationship between older adults' internal health locus of control and their self-reported medication adherence. Thus, if an older adult with hypertension feels as if they possess control over their health, they may then take the actions necessary to successfully mitigate the disease's effects by properly taking their antihypertensive medication.

Self-efficacy, the belief in one's ability to achieve certain goals with directed action, is also an important predictor regarding whether one adheres to their medication and may even trump one's health locus of control (Bandura, 1977; Mitzner, McBride, Barg-Walkow, & Rogers, 2013; Wallston, 2001). Higher self-efficacy, for instance, has been found to relate to elevated health status as well as an elevated likelihood of performing healthy behaviors (Cross, March, Lapsley, Byrne, & Brooks, 2006; Grembowski et al., 1993; O'Leary, 1985). For example, a study performed

by Taal, Rasker, Seydel, and Wiegman (1993) examined issues related to adhering to recommended health behaviors for the management of rheumatoid arthritis among adults (M = 60 years) and found that self-efficacy played an influential role, suggesting that those with lower self-efficacy experienced more difficulty in performing these behaviors. Regarding medication adherence specifically, self-efficacy may positively influence one's ability to manage chronic diseases by adhering to prescribed medications (O'Leary, 1985)

In sum, it appears that if older adults believe they have control over their health and possess the ability to achieve health-related goals, they are more likely to do so. To my knowledge, no studies have investigated these subjective beliefs and their influence on the strategic behaviors utilized to adhere to antihypertensive medication by older adults, and these perceptions could impact the employment of various medication management strategies by this population.

1.3.4 Health Literacy

Health literacy as well as health comprehension may also play an important role in medication management behaviors (Levinthal, Morrow, Tu, Wu, & Murray, 2008; Park et al., 1999). Health literacy has been defined as "the degree to which an individual has the capacity to obtain, communicate, process, and understand basic health information and services to make appropriate health decisions" (Centers for Disease Control and Prevention, 2015). Thus, one's health literacy holds the potential to influence their adherence to prescribed medications. Studies have shown that increasing age is negatively correlated with health literacy, which may hinder older adults' abilities to acquire and act on important health-related information (e.g., Federman, Wisnivesky, Wolf, Leventhal, & Halm, 2010; Levinthal et al., 2008). This is despite the fact that older adults generally possess more knowledge about health than younger adults (Beier & Ackerman, 2005). Evidence has also been found that health literacy may be a strong predictor of

mortality, as older adults with higher health literacy abilities generally possessed lower mortality rates (Baker, Wolf, Feinglass, & Thompson, 2008).

Specific to older adults with hypertension, Chin and colleagues (2011) evaluated the influence that processing capacity and knowledge (both domain-general and domain-specific) have on the health literacy scores of a sample of hypertensive older adults using two popular measures (S-TOFHLA & REALM; Baker, Williams, Parker, Gazmararian, & Nurss, 1999; Davis et al., 2003, respectively). Results portrayed a positive relationship between performance on the health literacy measures and both processing abilities and knowledge, supporting their proposed process-knowledge model of health literacy (see Figure 3). Evidence has also been presented for a relationship between lower health literacy levels and an inability to control one's blood pressure in a sample of primarily older adults with hypertension and cardiac disease (McNaughton, Jacobson, & Kripalani, 2014). However, some studies have not found associations between health literacy and medication adherence (e.g., Kripalani et al., 2010; Paasche-Orlow et al., 2006), or between health literacy and medication management strategies specifically (e.g., Kripalani et al., 2010). Thus, older adults' health literacy abilities could play an important role in how they understand important health-related information regarding the management of their health and may influence the strategies they employ to adhere to their prescribed medications but more research is needed to understand these relationships.

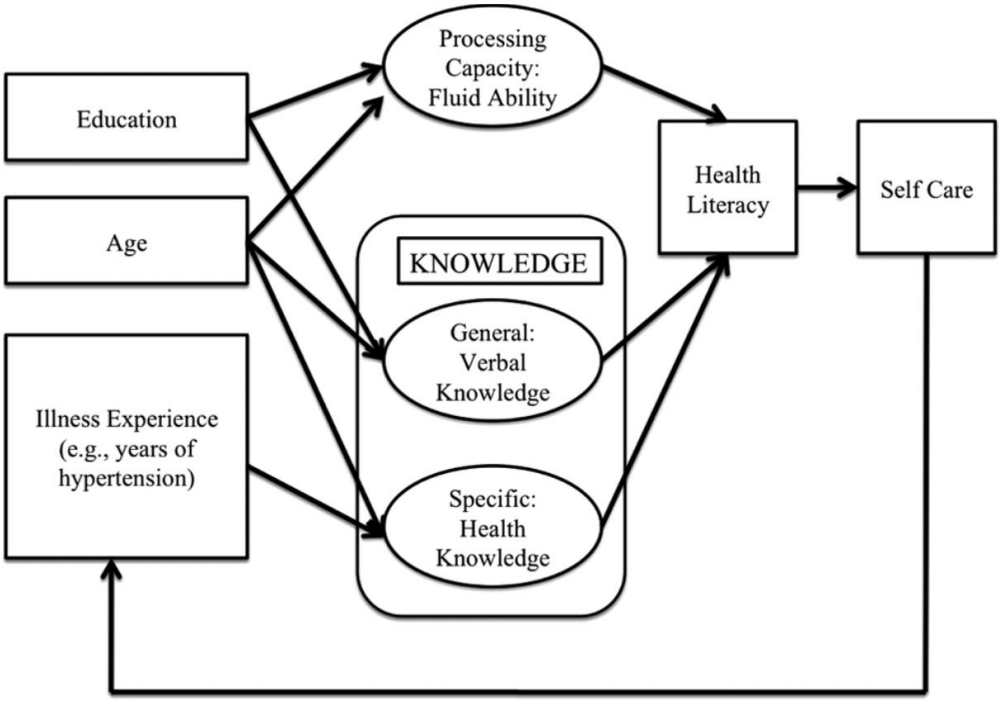

Figure 3. The process-knowledge model of health literacy as presented by Chin and colleagues (2011).

1.3.5 Lifestyle and Medication Regimen

An older adult's lifestyle may also be a significant influence on the strategic management of their medication. If an older adult is living a busy lifestyle or commonly experiences events that interrupt their daily routine, difficulties might arise in initiating their medication management behaviors, and research has shown some evidence that this may be the case. For instance, multiple studies have found that the most common reason that contributed to forgetting to take one's medications was due to events that interfered with normal routines (e.g., travel), suggesting that older adults struggled to compensate for these deviations (Boron et al., 2013; Sanchez, Nichols, Mitzner, Rogers, & Fisk, 2003). The absence of symptoms for hypertension might exacerbate these adherence challenges, although similar findings were also presented in a study assessing the medication adherence of adults with rheumatoid arthritis (Park et al., 1999), The common finding

of lower adherence rates by middle aged adults may also support this idea due to the increased likelihood of busier daily lives in comparison to older adults (Kripalani et al., 2010; Morrell et al., 1997; Park et al., 1999).

The complexity of one's medication regimen may also impact endorsed strategies, and this complexity involves the number of medications they must manage as well as how often these medications must be ingested (e.g., time of day; Boron et al., 2013). Older adults have been generally shown to struggle with more complex tasks than younger generations (Cerrella, Poon, & Williams, 1980), and trends have been found regarding a relationship between age and increasing regimen complexity (Conn, Taylor, & Kelley, 1991). However, the degree of impact that regimen complexity may have has been debated. Some studies have presented evidence for a relationship between adherence behaviors and regimen complexity (e.g., Boron et al., 2013; Claxton, Cramer, & Pierce, 2001; McElnay & McCallion, 1998). The aforementioned study performed by Park and colleagues (1999) did not find that regimen complexity was significantly influential, although this study sampled those with a symptomatic illness (rheumatoid arthritis). Thus, the findings may not be generalizable to those with a mostly asymptomatic condition such as hypertension. Moreover, the medications one takes at the same time as their antihypertensive medication could impact their adherence. For instance, if an older adult has been asked to take medication for a symptomatic disease (e.g., osteoarthritis) when they are also supposed to take their antihypertensive medication, this may remind them to ingest both medications. Therefore, one's medication regimen could influence the strategies they utilize.

1.4 Assessing Older Adults' Antihypertensive Medication Management

Some studies have attempted to understand the interplay of factors that may impede the proper self-management of hypertension (e.g., Feldman, Bacher, Campbell, Drover, & Chockalingam, 1998; Gascón et al., 2004; Morris et al., 2006). For example, one study performed by Krousel-Wood and colleagues (2009) attempted to better assess this issue using data from the Cohort Study of Medication Adherence in Older Adults (CoSMO). The CoSMO is a large-scale, cross-sectional study "designed to investigate barriers to, and determinants of, antihypertensive medication adherence and lay the groundwork for interventions to improve adherence and clinical outcomes" (Krousel-Wood et al., 2009, p. 2). While this study furthered the understanding of the general barriers of adherence (e.g., the asymptomatic nature, lack of knowledge), it did not investigate the specific medication management strategies the patients were using and how relevant factors, such as those discussed previously, may influence them (see Figure 4 for example).

Figure 4. Factors that may influence the endorsement and effectiveness of antihypertensive medication management strategies.

Kripalani, Gatti, and Jacobson (2010) evaluated the relationship between the medication management strategies of those with cardiovascular disease (primarily hypertension) through the use of quantitative methods but were limited in their generalizations as more detailed information was necessary to better understand the intricacies of their results. For example, the authors suggested that their finding that reliance on others for medication reminders was associated with poor adherence may be understood from multiple viewpoints: the strategy may be of generally poor utility, or the strategy may have been recommended by the participants' physicians due to previous adherence issues. Therefore, there still exists a need to better understand the strategies, motivations, internalizations, and other related characteristics of adherence that may be extracted from a qualitative experimental environment (e.g., semi-structured interview). In other words, understanding more than simply what an older adult is doing to attempt to manage their antihypertensive medication, but also why they are doing it and what other factors may influence these medication management behaviors might allow for a more detailed understanding of the issue than may be revealed by the sole use of quantitative methods.

A recent unpublished study attempted to better understand this qualitative perspective with an archival analysis (Blocker, 2016). Older adults with hypertension who were nonadherent to their medication participated in a prospective memory intervention designed to improve adherence (Insel, Einstein, Morrow, Koerner, and Hepworth, 2016). Sixty-four responses to four self-management interview questions were qualitatively coded to identify relevant themes regarding participants' internalizations of their hypertension and prescribed medication, as well as the strategies and goals related to managing the disease. The majority of participants endorsed the association strategy as their primary strategic method, which differed from the results of Boron and colleagues' (2013) assessment of general medication management strategies but mimicked the findings of other studies (Kripalani et al., 2010; Sanchez et al., 2003). Participants also expressed

goals that generally lacked detail (e.g., “My goal is to lower my blood pressure.”), and about 25% of responses pertaining to their declarative knowledge were categorized as related to improper medication management (e.g., responses reflected a lack or absence of declarative knowledge, or were incorrect such as expressing that they knew when their blood pressure was elevated). Although these findings provided insight into the opinions of older adults and the strategic management of their antihypertensive medication, there was a limited number of questions asked to the participants as well as lack of probing questions to allow for elaboration. Therefore, there remains a need for a more comprehensive approach to assessing these opinions to better understand antihypertensive medication management strategies and the factors that influence these behaviors.

1.5 The Potential for Improving Antihypertensive Medication Adherence

Assessing the factors that influence the medication management strategies of older adults with hypertension (e.g., internalizations, motivations, perceived abilities) may lead to improvements in the design of interventions that attempt to address the issues this population confronts when managing the disease. For example, the aforementioned study performed by Insel and colleagues (2016) involved a multifaceted prospective memory intervention for older adults with hypertension (for study design, see Insel, Einstein, Morrow, & Hepworth, 2013). Those assigned to the intervention condition significantly improved in their medication adherence when compared to baseline, and the benefits were found to be more robust for those with lower executive function and working memory per a composite score. Although promising, the gains these older adults experienced in medication adherence returned to baseline within five months of the cessation of the intervention. This regression illustrates the need for a more thorough and foundational understanding of how older adults attempt to utilize medication management strategies to control their hypertension, as well as the factors that may affect these strategies such

as their illness representations, goals, control beliefs, among others. Together, these variables may impact antihypertensive medication management, a behavior vital for controlling their blood pressure and, thus, overall health. By improving this understanding, it may be possible to increase the lasting efficacy of medication management interventions that can assist the older adult population to experience successful adherence, increasing the likelihood that they will sustain longer and more comfortable lives.

CHAPTER 2. OVERVIEW OF STUDY

The goal of the current study was to better understand the medication management strategies older adults with hypertension report using, as well as to improve upon our understanding of the factors that influence the effectiveness of these strategies. The following research questions were addressed:

1. How do older adults approach the management of their prescribed antihypertensive medication?
2. What factors are commonly discussed regarding the management of older adults' antihypertensive medication?

To address these questions, a semi-structured interview was designed to assess the strategies older adults with hypertension use to manage their prescribed medications as well as the factors that hold the potential to contribute to their endorsement and effectiveness. Questionnaires collected more detailed information regarding these medication strategies as well as descriptive information about the participating sample of older adults.

CHAPTER 3. METHOD

3.1 Participants

A sample of 40 older adults (65-85 years) previously diagnosed with hypertension and prescribed antihypertensive medication to manage the disease were recruited from the greater Atlanta metropolitan area. Due to the semi-structured interview component of the study as well as the characteristics of the accompanying questionnaires, participants were required to be fluent in English. The majority of participants travelled to the Georgia Institute of Technology's Human Factors and Aging Laboratory for assessment. Four interviews were performed at participants' residences as they lacked adequate transportation to the testing environment. Individuals residing in nursing or assisted living facilities were excluded from the study as these living situations increased the likelihood that the participant received assistance with their medications. Participants were also excluded if they had signs of cognitive impairment (< 21 on the Modified Telephone Interview for Cognitive Status [TICS-M; de Jager, Budge, & Clarke, 2003; see Appendix A]), as this impairment may hinder participation in the assessments and has also been found to negatively impact medication adherence rates (e.g., Hayes, Larimer, Adami, & Kaye, 2009). For a summary of participants' demographic information, see Table 1.

Table 1.
Participant Demographics.

Variable	**Frequency**
Total Participants	40
Age (Years), Mean (*SD*)	75.62 (4.89)
Gender, N (%)	
Female	21 (52.5%)
Male	19 (47.5%)
Ethnicity, N (%)	
Black or African American	19 (47.5%)
White	19 (47.5%)
More than one race	1 (2.5%)
Other	1 (2.5%)

Table 1 (continued).

Education, N (%)	
High School Graduate/GED	4 (10%)
Vocational Training	4 (10%)
Some or In-progress college/Associate's Degree	16 (40%)
Bachelor's Degree (BA, BS)	6 (15%)
Master's Degree (or other post-graduate training)	6 (15%)
Doctoral Degree (Ph.D., M.D., Ed.D., D.D.S., J.D., etc.)	4 (10%)
Prescribed Medications, Mean (*SD*)	4.63 (3.42)

3.2 Measures

Participants completed the following measures.

3.2.1 Demographic and Background Information

Participants' demographic information, such as age, educational experience, and other relevant background information, as well as their subjective health status, comorbidities, and the complexity of their medication regimen, were collected with the Demographic and Background Information Questionnaire commonly used by the Human Factors and Aging Laboratory at the Georgia Institute of Technology (see Appendix B).

3.2.2 Self-reported Antihypertensive Medication Adherence Rates

Participants completed the Morisky Medication Adherence Scale (MMAS-8; Morisky, Ang, Krousel-Wood, & Ward, 2008) which is an 8-item assessment containing questions relevant to an individual's level of antihypertensive medication adherence (see Appendix C). This scale has been found to not only be a reliable and valid measure of medication adherence, but has also exhibited significant associations with individuals' control of their hypertension specifically (e.g., Holt, Muntner, Joyce, Webber, & Krousel-Wood, 2010; Morisky et al., 2008). Participants were asked to answer seven yes/no questions regarding various adherence-related behaviors and opinions. The final question asked participants to rate how often they have experienced difficulty

taking their antihypertensive medication and used a 5-point Likert scale ranging from 1 (never/rarely) to 5 (all the time). Responses to these questions were then scored, and these scores allow for the classification of antihypertensive medication adherence into high adherence (8), medium adherence (6 - < 8), or low adherence (≤ 6).

3.2.3 Health Literacy

The Short Test of Functional Health Literacy in Adults (S-TOFHLA; Baker et al., 1999; see Appendix D) is a brief health literacy measure used to assess an individual's ability to read and comprehend health information. Participants were presented with two health-related passages containing incomplete sentences. They were then asked to select the most appropriate choice from a list of four options to correctly complete the sentences. The first passage has been designed to reflect a 4th grade reading level, while the second passage has been designed to reflect a 10th grade reading level. Participants scores are calculated by summing the total number of correct answers out of the 36 possible selections. Scores greater than 22 are classified as adequate, scores greater than 16 are classified as marginal, and those less than or equal to 16 are classified as inadequate. The test has a total duration of seven minutes, in which both passages are to be completed.

3.2.4 Medication Management Strategies

Medication management strategies were assessed with a Medication Management Strategy Questionnaire (adapted from Boron et al., 2013; see Appendix E). Participants were asked whether they utilize any medication management strategies to remember to take their antihypertensive medication. The strategies and definitions presented are based on Boron et al. (2013), with the inclusion of an additional strategy (social reminders). These strategies are, in alphabetical order: association, external reminders, location, mental planning, physical discomfort, pill organizer,

social reminders, and visibility. Participants were then asked to rate how often they use their endorsed strategies using a 5-point Likert scale ranging from 1 (never) to 5 (always), as well as the perceived effectiveness of these strategies using a 5-point Likert scale ranging from 1 (not very effective) to 5 (very effective).

3.2.5 Antihypertensive Medication Management Interview

A semi-structured interview designed specifically for this study assessed participants' antihypertensive medication management strategies, as well as their opinions regarding factors related to the self-management of their hypertension and their prescribed antihypertensive medication (for the complete interview script, see Appendix F). Participants were asked to describe how they remember to take their antihypertensive medications to gain an understanding of the medication management strategies they are using, as well as to reflect upon how effective they feel these strategies are, whether they have always used them, as well as what led to their endorsement of these strategies (i.e., self-created or recommended). To understand participants' illness representation, multiple questions were designed to assess topics relevant to the five components of the Common Sense Model of Illness Representation: cause (e.g., "What do you think caused your hypertension?"), consequences (e.g., "What do you think are the consequences of forgetting to take your blood pressure medication?"), control (e.g., "Do you believe you have control over your blood pressure?"), identity (e.g., "Imagine you are talking to someone who was just diagnosed with hypertension about the condition. What would you tell them about what it's like to have hypertension?"), and timeline (e.g., "How long do you expect to have hypertension?").

Control beliefs were assessed with questions focusing on participants' health locus of control (e.g., "Do you believe you have control over your blood pressure medication?") as well as their self-efficacy regarding managing their antihypertensive medication (e.g., "How confident are

you in your ability to manage your antihypertensive medication?"). To assess declarative knowledge, participants were asked to discuss what they know about hypertension as a disease, its symptoms (i.e., whether they possess knowledge of its asymptomatic characteristic), and the antihypertensive medication they have been prescribed. Participants were also asked to reflect upon any goals they may have set regarding the management of their overall health, their hypertension, and taking the medication they have been prescribed (e.g., "What are your goals regarding taking your medication?").

Additionally, participants were asked to discuss whether they sometimes forget to take their antihypertensive medication, and what they perceive to be the reason for their successes or failures in maintaining proper medication adherence (e.g., "Do you sometimes forget to take your medication? If yes: why do you think you sometimes forget to take your medication?"). Probing questions were also asked when necessary to elicit more information from participants' responses (e.g., "Could you expand upon what you meant by…?").

3.3 Procedure

Prior to enrolment in the study, participants completed a screening interview via telephone in which qualifying information including age, diagnosis of hypertension, current prescription of antihypertensive medication, English fluency, as well as residential status (i.e., not currently residing in nursing or assisted living facilities), was collected. The screening also included the administration of the TICS-M to assess the possibility of cognitive impairment. Once all qualifying requirements were met, participants were scheduled to take part in the study. They were then mailed a packet which included a medication regimen information packet (see Appendix G) to be filled out prior to their scheduled session, primarily to assist with recalling and discussing their current prescribed medications during the interview. The mailed packet also included a sheet with

information relevant to the participant's appointment, directions to the laboratory, and a parking pass if necessary.

Once consent was obtained, participants were provided with a general introduction to the study and then asked to complete the first set of questionnaires assessing general demographic and background information (Demographics and Background Information Questionnaire), health literacy (Short Test of Functional Health Literacy in Adults), and self-reported antihypertensive medication adherence (MMAS-8). After completion of these questionnaires, participants completed the Antihypertensive Medication Management Interview, during which they were asked to refer to the aforementioned medication information packet to help them remember details regarding their medication and their routines. All verbal responses to the interview portion of the study were audio-recorded.

Upon completion of the interview, the recording device was turned off and a brief break was provided. Following the break, the Medication Management Strategy Questionnaire was completed. Participants were then provided a debriefing document detailing information related to the purpose and goals of the study, thanked for their participation, and compensated for their time at a rate of $12.50/hour. The duration of the study session was about two hours for each participant, and they received $25.

3.4 Analyses

The quantitative measures (Demographics and Background Information Questionnaire, MMAS-8, S-TOFHLA, MMSQ) were analyzed using descriptive statistics to describe participants' characteristics, opinions, and performance on the provided measures. These statistics included frequencies, means, and standard deviations.

Regarding the Antihypertensive Medication Adherence Interview, a qualitative coding scheme was developed to identify themes in medication management strategies and the factors that may influence these strategies. Audio recordings of the interviews, deidentified to ensure anonymity, were sent to a professional transcription company. To assess the content of the interviews, a coding scheme was initially developed using a top-down approach in which expected themes were extracted from the literature and previous research (for the complete coding scheme, see Appendix H). Examples of such themes included those relevant to the components of the aforementioned Common Sense Model of Illness Representation (Leventhal et al., 1984), the medication management strategies discussed by Boron et al. (2013), themes from a previous study on antihypertensive medication adherence (Blocker et al., in press), among others. The data were first segmented whereby a response segment was a participant's response to a relevant question. If a response was interrupted or if a follow-up question was asked to clarify what was being said, the participant's complete responses, both before and after the interruption of clarifying question, were considered a single segment. Instances relevant to the top-down categories of the coding scheme were then coded. An instance was defined as the existence of a relevant subcategory or theme from the coding scheme, and was only coded once even if mentioned multiple times in a participant's response segment.

The interview transcripts were split between two coders to allow for a more efficient analysis of the interview content, and a Cohen's Kappa statistic of 85% was set as a minimum interrater reliability goal (Cohen, 1960). Cohen's Kappa is a relatively conservative measurement of interrater agreement as it considers the possibility that coders may have agreed simply due to chance. An initial transcript was assessed by both coders in unison to allow for an open discussion on the coding scheme and coding process. After this transcript was coded and agreed upon changes were made to the coding scheme, the same transcript was once again coded separately by both

coders using MaxQDA software, which was designed for qualitative data analysis. The coded segments, excluding those that were designated at potential bottom-up subcategories, were then analyzed for subcategorical agreements using the software. The Cohen's Kappa statistic for the first transcript was 90.00%. Discrepancies were discussed and a novel, second interview was coded, resulting in a Cohen's Kappa statistic of 91.43%. As the average interrater reliability, 90.72%, was above the minimum goal of 85%, the transcribed interviews were then split between coders using a rounded 25%/75% split, in which the primary coder assessed 28 interviews, with the secondary coder assessing the remaining 10.

All qualitative opinions relevant to the topic of antihypertensive medication management were of interest to the study. Thus, a bottom-up approach was also taken to integrate novel themes and those that were not captured with the initial top-down approach of the coding scheme. As the two coders assessed the interviews, additional themes were coded and marked. Also, to ensure that coding the accuracy of hypertension and antihypertensive medication knowledge was done correctly, responses to the relevant questions were anonymized and sent to a subject matter expert (a Ph.D.-level nurse) for an accuracy analysis. Once interview coding was completed, the two coders reviewed the bottom-up themes, discussed commonalities among them, and integrated these new codes into novel subcategories. Examples of such bottom-up codes included the perceived symptoms one has experienced due to hypertension, and the goals that participants set regarding their general health and hypertension management.

CHAPTER 4. RESULTS

4.1 Quantitative Measures

4.1.1 Health Literacy

The participating sample was found to be generally health literate, with a mean score of 32.78 (*SD* = 3.64) on the Short Test of Functional Health Literacy in Adults (STOFHLA), with a possible range of 0 - 36. Using the classification criteria provided by the assessment, the mean score classified the sample as exhibiting adequate functional health literacy levels (i.e., scores of 23-36), suggesting an ability to read and understand the majority of health-related text and information.

4.1.2 Self-Reported Antihypertensive Medication Adherence

The Morisky Medication Adherence Scale's eight items assessed participants' self-reported ability to adhere to their antihypertensive medication. The mean score was 6.23 (*SD* = 1.67; possible range of 0 – 8). Thus, participants in this study were found to be of medium adherence per the classification scale used by the measure. It is of note that this score, although falling into medium adherence, is only slightly above the cut-off for low adherence (e.g., scores ≤ 6).

4.1.3 Medication Management Strategies

Participants were asked to endorse any of the eight strategies provided in the Medication Management Strategy Questionnaire that they use to remember to take their antihypertensive medication, as well as how often they used them and how effective they perceived them to be. All participants endorsed at least one strategy, and the mean number of endorsed strategies per person

was 3.98 (*SD* = 1.46), with a possible range of 0 – 8. It is of note that participants had the opportunity to endorse additional strategies other than those provided, possibly extending this range, but none chose to do so.

The most commonly endorsed strategy was the association strategy (e.g., taking one's antihypertensive medication with breakfast or after brushing their teeth), with 35 participants having endorsed using this method as part of their medication management routine. Following association, the most endorsed strategies were, in descending order, location (32), pill organizer (27), visibility (24), and mental planning (22). External reminders, social reminders, and physical discomfort were the least endorsed, with nine, eight, and five endorsements, respectively. Regarding perceived effectiveness and consistency of strategy use, the results reflected the same order of strategies as did the endorsements. Thus, participants' ratings using the 5-point Likert scales revealed that the association strategy was perceived as the most effective strategy (*M* = 4.83 [*SD* = 0.62]) and the most consistently used (*M* = 4.35 [*SD* = 1.41]). For an overview of the findings from the Medication Management Strategy Questionnaire, see Table 2.

Table 2.
Results of Medication Management Strategy Questionnaire.

Number of Strategies Endorsed	
Mean (*SD)*	3.98 (1.46)
Strategy	**Endorsements***
Association	35
Location	32
Pill Organizer	27
Visibility	24
Mental Planning	22
External Reminders	9
Social Reminders	8
Physical Discomfort	5
Perceived Strategy Effectiveness	**Mean Rating (*SD*)****
Association	4.83 (0.62)
Location	4.81 (0.74)
Pill Organizer	4.74 (0.71)
Visibility	4.67 (0.76)
Mental Planning	4.27 (1.20)

Table 2 (continued).

External Reminders	3.78 (1.09)
Social Reminders	3.25 (1.04)
Physical Discomfort	3.20 (1.64)
Consistency of Strategy Use	**Mean Rating (*SD*)*** **
Association	4.35 (1.41)
Location	4.13 (1.65)
Pill Organizer	3.56 (1.85)
Visibility	3.25 (1.93)
Mental Planning	2.70 (1.74)
External Reminders	1.43 (0.93)
Social Reminders	1.40 (0.90)
Physical Discomfort	1.15 (0.43)

*$N = 40$
**Measure used a 5-point Likert scale ranging from 1 (not very effective) to 5 (very effective)
***Measure used a 5-point Likert scale ranging from 1 (never) to 5 (always)

4.2 Qualitative Results

Results of the qualitative coding are reported below. Subcategories with less than 5% of the coded segments within a category were omitted, unless the category contained only two subcategories (e.g., yes or no). For a list of the topics of interest and the higher-level categories comprising the coding scheme, see Table 3, and for a complete overview of the coding results, including the omitted categories as well as example quotes, see Appendix H.

Table 3.
Topics of interest and higher-level categories of the coding scheme designed to capture older adults' behaviors, internalizations, and perceptions relevant to the management of their hypertension and antihypertensive medication.

Topic of Interest	**Categories**
Adherence and Related Characteristics	Perceived Occurrence of Nonadherence to Antihypertensive Medication
	Reasons for Nonadherence*
	Reasons for Adherence*
	Perceived Consequences of Nonadherence
	Experience with Current Antihypertensive Medication
	Perceived Importance of Proper Antihypertensive Medication Adherence
	Reasons for Importance of Proper Antihypertensive Medication Adherence*
	Experienced Side-effects of Current Medication
	Medication Regimen Complexity

Table 3 (continued).

Antihypertensive Medication Management Strategies	Routine Usage
	Strategies Used in Participants' Routines
Antihypertensive Medication Management Strategy Characteristics	Source of Routines
	Perceived Effectiveness of Routine
	Consistency of Current Routine Use Over Time
	Expectation of Using Same Routine in the Future
	Reasons for Expected Use of Same Routine with Age
Declarative Knowledge	Expressed Knowledge Accuracy
	Knowledge of Asymptomatic Nature
	Expressed Knowledge of General Symptoms
	General Symptoms Mentioned*
	Source of Hypertension Knowledge
	Information to Know Regarding Living with Hypertension*
Perceived Causes of Hypertension	Perceived Cause of One's Hypertension*
Perceived Consequences	Perceived Significance of Hypertension in One's Life
Control: Goal Setting	Participant Set General Health Goals
	General Health Goals Mentioned*
	Participant Set Hypertension Goals
	Hypertension Goals Mentioned*
	Participant Set Antihypertensive Medication Goals
	Antihypertensive Medication Goals Mentioned*
Control: Locus of Control	General Health Locus of Control
	Hypertension Locus of Control
	Antihypertensive Medication Locus of Control
Control: Self-Efficacy	Medication Management Self-efficacy
	Reasons for Confidence*
Identity: Perceived Symptoms	Personal Hypertension Symptoms
	Specific Symptoms Experienced*
Timeline of Hypertension Management	Length of Time with Hypertension
	Length of Time Expecting to Have Hypertension
	Length of Time One Expects to Need to Take Their Medication

*Denotes categories containing bottom-up coded subcategories

4.2.1 Adherence and Related Characteristics

Table 4.
Codes and frequencies pertaining to adherence and related characteristics.

Category	**Subcategory**	**Frequency (%)**
Perceived Occurrence of Nonadherence to Antihypertensive Medication	Yes	27 (67.5%)
	No	12 (30.0%)

Table 4 (continued).

Reasons for Nonadherence	Busyness/Break in Routine	22 (52.4%)
	Travel	8 (19.0%)
	Memory Issues	3 (7.1%)
	Running Out of Medication	3 (7.1%)
	Social Influences (e.g., visitors)	3 (7.1%)
Reasons for Adherence	Routine	10 (83.3%)
	Motivated by Overall Importance of Proper Medication Adherence	2 (16.7%)
Perceived Consequences of Nonadherence	Significant consequences of long-term nonadherence	37 (47.4%)
	Insignificant consequences of short-term nonadherence	29 (37.2%)
	Significant consequences of short-term nonadherence	10 (12.8%)
Experience with Current Antihypertensive Medication	Always Prescribed Current Antihypertensive Medication	17 (40.5%)
	Switched Due to Side-Effects	10 (23.8%)
	Switched Due to Physician's Recommendation	5 (11.9%)
	Switched Due to Cost	3 (7.1%)
	Medications Added to Aid in Lowering Pressure	3 (7.1%)
Perceived Importance of Proper Antihypertensive Medication Adherence	Expressed Importance	38 (97.4%)
	Expressed Unimportance	1 (2.6%)
Reasons for Importance of Proper Antihypertensive Medication Adherence	Continue to Experience Positive Outcomes of Med	15 (38.5%)
	Avoid Consequences of the Disease	12 (30.8%)
	Importance of Listening to Physician	10 (25.6%)
Experienced Side-effects of Current Medication	No Medication Side-effects	37 (94.9%)
	Medication Side-effects	2 (5.1%)

Table 4 (continued).

Perceived Impact of Medication Regimen Complexity on Adherence	Insignificant Impact	38 (97.4%)
	Significant Impact	1 (2.6%)

Older adults in the current study were asked to reflect upon various questions related to their medication adherence and related characteristics of their prescribed medication and regimen. For an overview of the codes and frequencies pertaining to these factors, see Table 4. Participants were asked about whether they sometimes fail to take their antihypertensive medication as prescribed (i.e., proper adherence), and 30% said that they were consistently adherent. However, the majority (67.5%) responded that they were occasionally nonadherent, and they were asked what they believed led to these prospective memory failures. Among the participants that stated they were occasionally nonadherent, the most common reason reported was one's routine being interrupted due to general busyness (52.4%). Second to busyness was travel, accounting for 19% of the total reasons contributing to nonadherence. Although other reasons were provided (e.g., memory issues, running out of medication), they were not as consistently reported as affecting adherence. Participants who perceived themselves to be consistently successful with adhering to their antihypertensive medication attributed this success to their routine (83.3%), with the remaining participants stating that they were consistently adherent because of their awareness of how important proper adherence is, motivating them to take their medication as prescribed (16.7%).

When asked about the significance of the consequences one might expect if they forgot to take their antihypertensive medication, a common pattern emerged across participants' responses. Primarily, most expressed that if one were to miss a small number of doses in the short-term (e.g., a single does or multiple consecutive doses over the span of a few days), there would be insignificant consequences to one's health (37.2% of coded instances). However, if one were to

miss many doses over an extended period, participants expressed that they expected to experience significant consequences such as dangerously elevated blood pressure, stroke, heart attack, and other such complications, as 47.4% of coded instances reflected this opinion. However, 12.8% of the remaining instances reflected that there might be significant consequences, such as those just mentioned, if one forgets to take their antihypertensive medication in the short-term.

Understanding one's experiences with the medication they have been prescribed to manage the condition may also reveal information regarding how they internalize the management of the disease. Participants were asked multiple questions on this topic. One such question asked participants about their antihypertensive medication history. When asked whether they have always been prescribed their current antihypertensive medication, 40.5% of coded instances reflected always following their current regimen. Some participants, however, experienced changes to their prescriptions for various reasons. For example, 23.8% of instances were relevant to previously switching medications due to side-effects that they had experienced, and 11.9% of instances reflected switching medications due to a physician's recommendation. The remaining reasons mentioned by participants were switching medications due to cost (7.1%) and switching due to a lack of positive outcomes (7.1%). Some instances also reflected that participants had additional medications prescribed to aid in lowering their blood pressure (7.1%).

Another topic of interest regarding antihypertensive medication was how important participants perceive taking their medication to be. Coded instances revealed that participants were almost unanimous (97.4%) in stating that they believed taking their medication as prescribed is important to them. When asked why they thought it was an important thing to do, the most commonly coded instances reflected that they desired to continue experiencing the positive outcomes from taking the medication as prescribed (38.5%), that properly taking one's medication

is important to avoid the potential consequences of the disease (30.8%), and that it was important to follow the advice of their physician (25.6%). Additionally, we inquired whether participants currently experience any side-effects from their prescribed antihypertensive medication. Nearly all participants (94.9%) expressed that they do not experience any perceptible side-effects due to the medication they are currently taking. When asked about the impact that one's overall medication regimen complexity has on their medication management, nearly all participants (97.4%) stated that it plays an insignificant role.

4.2.2 Antihypertensive Medication Management Strategies

Table 5.
Codes and frequencies pertaining to participants' medication management strategy use.

Category	**Subcategory**	**Frequency (%)**
Strategy Use	Yes	40 (100%)
	No	0 (0%)
Strategies Mentioned	Association	31 (32.0%)
	Location	23 (23.7%)
	Visibility	17 (17.5%)
	Pill Organizer	16 (16.5%)
	Mental Planning	8 (8.2%)

Participants were asked about the process they used to remember to take their antihypertensive medication to understand whether they used a routine and what medication management strategies were involved in these routines. For an overview of the codes and frequencies pertaining to these factors, see Table 5. When prompted to discuss their routines, all participants expressed using at least one medication management strategy to help aid them in remembering to take their antihypertensive medication, per the eight strategies defined in the coding scheme. The association strategy was the most mentioned, with 32% of total used strategies. Following the association strategy was location (23.7%), visibility (17.5%), pill organizer (16.5%), and mental planning (8.2%).

4.2.3 Antihypertensive Medication Management Strategy Characteristics

Table 6.
Codes and frequencies pertaining to the characteristics of participants' routines and related management strategies.

Category	**Subcategory**	**Frequency (%)**
Source of Routines	Personal	30 (75.0%)
	Social	6 (15.0%)
	Physician	2 (5.0%)
	Unsure	2 (5.0%)
Perceived Effectiveness of Routine	Effective	40 (100%)
	Ineffective	0 (0%)
Use of Routine and Relevant Strategies Over Time	Consistent Use	30 (75.0%)
	Previous Modification	8 (20.0%)
	Unsure	2 (5.0%)
Expectation of Using Same Routine in the Future	Yes	39 (97.5%)
	No	1 (2.5%)
Reasons for Expected Use of Same Routine with Age	Success of Routine	26 (65%)
	Ease of Routine	6 (15%)
	No Reason to Change Routine	4 (10%)
	Unsure	4 (10%)

4.2.3.1 Source of Participants' Strategy Routines

The characteristics of older adults' medication management routines and relevant strategies were assessed through various questions on this topic. For an overview of the codes and frequencies pertaining to these characteristics, see Table 6. Participants were asked about the source of their routines to understand what inspired them to use such methods to remember to take their antihypertensive medication. The majority of responses to this question revealed the source of these routines to be primarily self-generated, with 75% of coded instances reflecting that participants created their own routines. The remaining participants (15%) declared that their routines were generated with social sources (; i.e., adapting strategies that others recommended or

used in their own routines), were suggested by their physician (5%), or they were unsure of the source of their routines (5%).

4.2.3.2 Perceived Effectiveness

When asked to reflect upon how well one believed their medication management routine worked for them (i.e., perceived effectiveness), every participant (100%) responded that they believed their routine to be effective and that they did not have any issues using it.

4.2.3.3 Strategy Use Over Time

Another characteristic of participants' strategy use was the amount of time they have been using their current routines. When asked, the majority of participants (75%) responded that they have used the same routine since they were diagnosed with hypertension and needing to manage their relevant prescribed medication, while only 20% of participants stated that they had adjusted their routine over time. The remaining participants (5%) were unsure of whether they had changed their routine in the past. Participants were also asked about whether they believed they would continue to use their routines as they aged and the possibility of age-related impairments increased. Still, 97.5% expressed that they had no intentions to change the strategies they used. Those that stated that they did not believe they would change their routine were then asked why they expected to continue doing what they have been doing. Most responses (65%) were related to the success that they have experienced thus far being the primary reason, while others regarded the ease of their routine (15%), that there was no perceived reason to change what they were doing (10%), or were unsure of why they expected to use their current routine as they age (10%).

4.2.4 Declarative Knowledge

Table 7.
Codes and frequencies pertaining to the participants' declarative knowledge about hypertension.

Category	Subcategory	Frequency (%)
Expressed Knowledge Accuracy	Accurate	132 (78.6%)
	Inaccurate	32 (19%)
	Improbable	4 (2.4%)
Knowledge of Asymptomatic Nature	Did Not Mention Asymptomatic Nature	21 (52.5%)
	Mentioned Asymptomatic Nature	19 (47.5%)
Expressed Knowledge of General Symptoms	Yes	23 (57.5%)
	Unsure	12 (30%)
	No	5 (13.5%)
General Symptoms Mentioned	Dizziness	8 (20%)
	Headaches	6 (15%)
	Vision Issues	6 (15%)
	Fatigue	6 (15%)
	Fainting	2 (5%)
	Lightheadedness	2 (5%)
	General Feelings of Illness	2 (5%)
Source of Hypertension Knowledge	Physician	20 (35.7%)
	Social	20 (35.7%)
	Personal Acquisition	16 (28.6%)
Living with Hypertension	Importance of Managing Food Intake	14 (19.7%)
	Importance of Proper Medication Adherence	12 (16.9%)
	Consistent Focus on Management of Hypertension	9 (12.7%)
	Awareness of Hypertension's Asymptomatic Nature	8 (11.3%)
	Need to Control Anxiety/Stress	7 (9.9%)
	Importance of Regular Exercise	5 (7.0%)
	Importance of Listening to Physician's Advice	4 (5.6%)

4.2.4.1 Declarative Knowledge Accuracy

Participants were asked questions relating to their perceived knowledge about hypertension. For an overview of the codes and frequencies pertaining to this knowledge, see Table 7. The overall accuracy of statements made my participants was assessed with the aid of a subject matter expert (a Ph.D.-level nurse). Participants' responses to the questions about what they knew about hypertension as well as what someone who is newly-diagnosed with the disease should know about its management were analyzed for possible misconceptions and falsities. After the analysis was completed and returned, all individual instances regarding perceived knowledge about

hypertension and its management were summed. For example, a single instance of a statement might include a sentence fragment such as, "…blood pressure involves systolic and diastolic pressures…" Inaccurate instances were marked by the subject matter expert, and the number of inaccurate statements were then totaled and divided by the total number of statements, yielding the percentage of inaccurate statements made by the older adults in the current study. As previously mentioned, although hypertension is primarily asymptomatic, it is possible a person to experience some symptoms due to elevated blood pressure (e.g., hypertensive crisis). Therefore, statements made by participants about their knowledge of the symptoms that accompany hypertension were not marked as inaccurate, but instead designated as improbable as there is some chance that an individual may experience these symptoms, although the symptoms expressed may have been misattributed to hypertension.

It was found that 19.2% of the statements regarding what participants knew about hypertension and its management were inaccurate. Only 2.4% of statements regarded perceived knowledge about the disease's symptoms, and were categorized as improbable. In addition, less than half of the older adults (47.5%) stated that they knew that the disease was asymptomatic. Interestingly, of the 19 participants that stated they knew hypertension was asymptomatic, eight (42.1%) then stated that they personally experienced symptoms from the disease.

4.2.4.2 Expressed Knowledge of General Symptoms

Participants were asked if they knew of any general symptoms that an individual diagnosed with the disease might experience. Most participants (67.5%) stated that they knew of general symptoms related to the disease. The most commonly mentioned were dizziness (20%), headaches (15%), vision-related issues (15%), and fatigue (15%).

4.2.4.3 Source of Declarative Knowledge of Hypertension

When asked about where they had learned their information regarding hypertension, participants responded with three primary sources. These sources, which accounted for all instances, were the following: learning directly from their physician (35.7%), from social sources (35.7%; e.g., friends, family), and from their own research on the topic (28.6%).

4.2.4.4 Important Topics Related to Living with Hypertension

To understand how participants internalized as important relevant to living with hypertension, as well as what they believed they knew regarding living with the disease, they were asked to imagine a scenario in which they were to tell someone who was recently diagnosed with the disease what it is like to live with and manage the condition. A variety of factors that participants perceived as important to tell this hypothetical individual were mentioned. The most prevalent coded instances were relevant to the importance of managing one's food intake (19.7%; e.g., avoiding unhealthy foods, excess salt) and the importance of proper medication adherence (16.9%). Other commonly mentioned topics were to ensure that they are consistently focused on the management of their hypertension (12.7%), to be aware of hypertension's asymptomatic nature (11.3%), to control their anxiety or stress to facilitate living with the condition (9.9%), that it is important to exercise regularly (7.0%), and that it is important to listen to your physician's advice regarding the disease (5.6%).

4.2.5 Cause

Table 8.
Codes and frequencies pertaining to the perceived cause of participants' hypertension.

Table 8 (continued).

Category	Subcategory	Frequency (%)
Perceived Causes of One's Hypertension	General Genetics	17 (31.6%)
	Stress	14 (24.6%)
	Diet	11 (19.3%)
	Unsure	5 (8.8%)
	Weight	4 (7.0%)

Participants were asked to reflect upon what they believed caused their hypertension. For an overview of the codes and frequencies pertaining to the perceived causes, see Table 8. In general, the majority of coded instances were related to one's lifestyle and personal experiences (59.9%) rather than heredity (31.6%). Specifically, of those who expressed lifestyle-related reasons causing their hypertension, 25% of responses were related to stress and/or anxiety leading to the disease, 19.3% to their diet, and 7.0% to their weight. 8.9% of instances were related to participants being unsure of what may have caused their hypertension.

4.2.6 Consequences

Table 9.
Codes and frequencies pertaining to the perceived consequences of hypertension on participants' lives.

Category	Subcategory	Frequency (%)
Perceived Significance of Hypertension in One's Life	Insignificant Role	30 (76.9%)
	Significant Role	9 (23.1%)

Participants were asked about how much of a role hypertension plays in their lives. In other words, whether they were consistently aware of the condition and attempting to take actions relevant to its management. Over three-fourths of participants (76.9%) stated that the disease played a relatively insignificant role in their daily lives, while the remaining stated the opposite (23.1%).

4.2.7 Control

4.2.7.1 Goal Setting

Table 10.
Codes and frequencies pertaining to participants' setting of goals related to their general health, hypertension, and their antihypertensive medication.

Category	Subcategory	Frequency (%)
Participant Set General Health Goals	Yes	37 (92.5%)
	No	3 (7.5%)
General Health Goals Mentioned	Lose Weight	17 (34%)
	Improve/Maintain Physical Fitness	13 (26%)
	Increase Lifespan	7 (14%)
	Overall Improvement of Well-being	4 (8%)
Participant Set Hypertension Goals	No	23 (57.5%)
	Yes	17 (42.5%)
Hypertension Goals Mentioned	General Lifestyle Management (Diet, Exercise, Etc.)	6 (30.0%)
	Maintain Current Management Routine	6 (30.0%)
	Lower or Control Blood Pressure	5 (25.0%)
	Manage the Symptoms	1 (5.0%)
	Reduce the Chances of Related Diseases	1 (5.0%)
	Consistently Monitor It	1 (5.0%)
Participant Set Antihypertensive Medication Goals	Yes	23 (59.0%)
	No	16 (41.0%)
Antihypertensive Medication Goals Mentioned	Take Medication as Prescribed	15 (62.5%)
	Reduce Need for or Amount of Medication	9 (37.5%)

Participants were asked about the goals they have set regarding three separate topics: their overall health, their hypertension, and the management of their antihypertensive medication. For an overview of the codes and frequencies pertaining to participants' goal setting, see Table 10. When asked to reflect upon whether they had set any goals related to their general health, 92.5% of participants expressed setting at least one goal, while 7.5% stated they had not set any such goals. When asked about what general health goals participants had set, the two most commonly

mentioned were to lose weight (34%) and to improve and/or maintain their physical fitness (26%; e.g., exercise more frequently). Following these two goals, participants also expressed that they had set goals related to increasing their lifespan (14%), and an overall improvement of their well-being (8%; e.g., to be as healthy as they can).

Regarding setting goals related to hypertension management, most participants (57.5%) expressed that they had not set any such goals. Of those that did set hypertension management goals, the following were the most commonly mentioned: maintain one's current hypertension management routine (30%), successful lifestyle management (30%; e.g., healthy diet, regular exercise), and to lower and/or control their blood pressure (25%).

Unlike the hypertension-related goals, most participants (59%) expressed that they had set goals relevant to the management of their antihypertensive medication. Two goals comprised the entirety of coded instances. These goals were to take their medication as prescribed (62.5%) and to reduce the amount of, or need for, their antihypertensive medication (37.5%).

4.2.7.2 Locus of Control

Table 11.
Codes and frequencies pertaining to participants' locus of control regarding their general health, hypertension, and their antihypertensive medication.

Category	**Subcategory**	**Frequency (%)**
General Health Locus of Control	Internal	33 (82.5%)
	Mixed	6 (15%)
Hypertension Locus of Control	Internal	31 (77.5%)
	Mixed	4 (10%)
	External	3 (7.5%)
	Unsure	2 (5%)

Table 11 (continued).

Antihypertensive Medication Locus of Control	Internal	36 (90%)
	Mixed	3 (7.5%)

Participants were asked to reflect upon their perceived locus of control regarding the same three topics discussed for goal setting: general health, hypertension management, and antihypertensive medication management. For each topic, several participants stated multiple loci of control (e.g., both internal and external control) which were coded as representing a mixed locus of control. For an overview of the codes and frequencies pertaining to participants' locus of control regarding their general health, hypertension, and their antihypertensive medication, see Table 11.

Regarding general health locus of control, 82.5% of coded instances reflected an internal locus of control in which participants stated that they believed that they, as individuals, possessed control over their general health. Coded instances reflecting a mixed locus of control represented 15% of responses. The remaining instance represented an external locus of control (2.5%), which is the belief that other influences (e.g., a higher power, other people) are more responsible for the control of one's health.

A similar distribution of results was evident when participants reflected on their control over their hypertension. As such, 77.5% of coded instances reflected an internal hypertension locus of control, with 10% reflecting mixed loci, and 7.5% of instances reflecting an external locus of control. The remaining coded instances portrayed participants' uncertainty with where they believed the control over their hypertension originated.

Finally, participants' attitudes regarding their antihypertensive medication management loci of control were questioned. Nearly all coded instances reflected an internal locus (90%), with

the remaining instances representing a mixed locus of control (7.5%) or an external locus of control (2.5%).

4.2.7.3 Self-efficacy

Table 12.
Codes and frequencies pertaining to the participants' self-efficacy regarding their ability to take their antihypertensive medication correctly.

Category	Subcategory	Frequency (%)
Medication Management Self-efficacy	High Self-efficacy	37 (94.9%)
	Low Self-efficacy	2 (5.1%)
Reasons for Confidence	Using a Routine	20 (46.5%)
	Importance of Taking Medication	10 (23.3%)
	General Confidence in One's Abilities	7 (16.3%)
	Overall Success in Taking Medication	5 (11.6%)

We were curious about how participants perceived their ability to take their antihypertensive medication as prescribed. To investigate this, we asked whether participants felt confident in this action. The clear majority of participants' responses reflected high self-efficacy, with 94.9% having expressed that they feel confident. When asked why they felt this confidence, the most common reason provided (46.5%) was that one's routine provided them this confidence in helping them remember to take it successfully. Other reasons provided for participants' higher self-efficacy were the overall importance that one takes it correctly (23.3%), as well as a general confidence in their overall abilities (16.3%), and that the confidence is due to their persistent success in adhering to their medication (11.6%). For an overview of the codes and frequencies pertaining to participants' self-efficacy regarding their ability to take their antihypertensive medication correctly, see Table 12.

4.2.8 Identity of the Disease

4.2.8.1 Personal Symptoms

Table 13.
Codes and frequencies pertaining to whether participants perceived experiencing symptoms of hypertension, and the identity of those perceived symptoms.

Category	Coding Subcategory	Frequency (%)
Personal Hypertension Symptoms	No	24 (60%)
	Yes	15 (37.5%)
Specific Symptoms Experienced	Fatigue	5 (26.3%)
	Dizziness	4 (21.1%)
	Stress	3 (15.8%)
	Headaches	3 (15.8%)
	Difficulty Sleeping	1 (5.3%)
	Swelling	1 (5.3%)
	Shortness of Breath	1 (5.3%)
	Increased Energy/Hyperactivity	1 (5.3%)

The Common Sense Model of Illness Representation refers to the identity component as related to the symptoms they believe are related to the disease with which they have been diagnosed. As hypertension is an asymptomatic disease, investigating whether a person perceives experiencing symptoms not only sheds light onto a possible misunderstanding of the condition, but also how the belief that it is causing physiological discomfort may impact their management of the disease and their prescribed medication. When participants were asked about whether they personally experienced side-effects that they attributed specifically to hypertension, 37.5% of participants (15 of the 40 interviewed) stated that they do, in fact, feel such symptoms. Twenty-four of the remaining participants (60%) stated they do not feel any symptoms, and one individual was not sure.

For those that expressed experiencing symptoms caused by their hypertension, a follow-up question asked what these specific symptoms happened to be. Eight total symptoms were

mentioned. In descending order in terms of the number of coded instances, the symptoms were: fatigue, dizziness, stress, headaches, difficulty sleeping, shortness of breath, swelling, and increased energy/hyperactivity. For an overview of the codes and frequencies pertaining to whether participants perceived experiencing symptoms of hypertension, and the identity of those perceived symptoms, see Table 13.

4.2.9 Timeline

Table 14.
Codes and frequencies pertaining to the temporal characteristics of hypertension and antihypertensive medication management.

Category	Coding Subcategory	Frequency (%)
Length of Time One has had Hypertension	General Timeline	23 (57.5%)
	Specific Timeline	15 (37.5%)
	Unsure	2 (5.0%)
Length of Time Expected to Have Hypertension	Rest of Life	22 (55.0%)
	Expected Cessation	9 (22.5%)
	Unsure	9 (22.5%)
Length of Time Expected to Need to Take Their Medication	Rest of Life	20 (50.0%)
	Unsure	12 (25.0%)
	Expected Cessation	8 (20.0%)

How people internalize the temporal characteristics of a disease such as hypertension holds the potential to impact the degree to which they attempt to manage it. Three questions were asked of participants in the interview to understand this perspective. The first question concerned how long the person had hypertension to gain an understanding of the significance of the diagnosis. Most coded responses to this question (57.5%) reflected a general sense of the amount of time participants had hypertension. Instances were coded in this manner when a participant had a non-

descript idea of how long it had been since their diagnosis and an inability to recall exactly when the diagnosis occurred. In contrast, 37.5% of coded instances for this topic were related to participants remembering specifically when they were diagnosed, and, thus, had internalized the exact amount of time they have had the disease. Only two participants' responses (5%) reflected being completely unsure of how long it had been.

To further investigate older adults' temporal internalizations of their hypertension, participants were asked a second time-related question about how long they expect to have the disease, which comprises the timeline component of the Common Sense Model of Illness Representation. Most responses reflected an expectation to have the disease for the entirety of one's life, representing 55% of coded instances, while 22.5% of instances reflected an expected cessation of hypertension, and the same percentage of instances reflecting uncertainty about the disease's duration. Finally, a similar question was asked regarding one's expectations regarding the need to take their antihypertensive medication. The majority of coded instances (50%) represented an expectation that one will need to take their antihypertensive medication for the rest of their life, with 20% relevant to an expected cessation in which one will be able to stop taking their prescribed medication. However, numerous instances were coded representing uncertainty about how long one will need to keep taking their antihypertensive medication (25%). For an overview of the codes and frequencies pertaining to the temporal characteristics of hypertension and antihypertensive medication management, see Table 14.

CHAPTER 5. DISCUSSION

5.1 Discussion and Implications

Of primary focus to the current study, the semi-structured interviews allowed for a more thorough understanding of how older adults diagnosed with hypertension approached the management of their antihypertensive medication, as well as the factors relevant to managing the disease that may influence these behaviors. Questions were designed to elicit how participants attempted to remember to take their antihypertensive medication (i.e., their routines and the strategies that comprise them), their perceived self-management ability, their internalizations of the illness (i.e., their illness representation), among other factors, allowing a more detailed analysis of this information than previous studies. In addition, the measures used to assess participants' demographics and background information, health literacy, self-reported antihypertensive medication adherence rates, and medication management strategy use provided descriptive information about the sample of older adults that took part in the research, giving personal context to the opinions shared in the interviews.

As the practical goal in understanding this information is the eventual improvement of adherence rates for older adults diagnosed with hypertension, it was necessary to understand the difficulties that participants in this study have had with taking the medication prescribed to treat the disease. The self-reported medication adherence information, as well as the questions of the semi-structured interview that targeted this topic, portrayed that the issues with adherence found in the general population seemed to be present among those that took part in the current study. Overall, the low-medium adherence per the MMAS-8 and the fact that many participants discussed experiencing adherence issues with taking their prescribed antihypertensive medication, despite overwhelmingly stating that proper adherence is important to them, support that there still exists a

serious issue regarding medication management for this asymptomatic disease. Thus, the data collected may not only help us understand what older adults are doing to manage their medication, but also elucidate why some of these issues with adherence are present.

5.1.1 Antihypertensive Medication Adherence and Related Factors

Participants expressed that being busy, leading to the inability to successfully initiate their usual routines, as the primary reason that interfered with their ability to properly take their medication. These findings reflect those found in previous studies regarding older adults with rheumatoid arthritis (Park et al., 1999), and for older adults when general medication management was investigated (Boron et al., 2013; Sanchez, Nichols, Mitzner, Rogers, & Fisk, 2003). In addition, those that expressed that they did not experience any issues with properly adhering to their antihypertensive medication designated that the management routine they used was the primary reason for this success. Thus, the perceived importance of one's routine in ensuring they stay adherent to their medication was expressed by nearly all participants, suggesting that without a routine that is consistently followed, adherence to antihypertensive medication becomes more difficult and more prone to failure, and that ensuring that older adults can remember to take their medication despite being faced with unexpected or abnormal situations may be key in supporting proper and consistent adherence. For example, integrating planning for possible interruptions to an older adult's routine may help them prepare for these events.

The composition of participants' routines (i.e., the strategies of which they are comprised), may be a primary influence on whether they are able to achieve successful antihypertensive medication management. Older adults in the current study endorsed using, on average, nearly four strategies to help them remember to take their medication. This was about twice the number found in previous studies of medication management (e.g., Boron et al., 2013; Kripalani et al., 2010) and

suggests the use of relatively complex routines by the sample. Although the reasoning behind this increase in the number of endorsed strategies is unclear, it is possible that having so many behaviors needing to work together to ensure an older adult remembers to take their antihypertensive medication could open these routines to more points of failure. In contrast, streamlining one's routine and the strategies they use may be easier for an older adult to not only execute these behaviors, but would be less prone to failures.

The most commonly endorsed strategy was the association strategy (e.g., taking medication with breakfast), which reflected the results in a previous study of antihypertensive medication management by Kripalani and colleagues (2010). Thus, it is possible that the use of this strategy may contribute to difficulties with maintaining adherence. As busyness was found to be the most common reason for forgetting to take one's medication, relying on associations with eating breakfast, making coffee, or other similar activities that might be interrupted, delayed, or skipped when one is experiencing a busy day may not be an effective method. For example, a morning doctor's appointment might cause an older adult to leave for their appointment without taking part in their usual behaviors, contributing to a failure to take their medication when they were supposed to because they needed to skip their morning coffee or other activity that shares the association with taking their medication. Still, the association strategy was also considered the most effective individual strategy and used most often by participants.

Although not evaluated in the current study, understanding the use and effectiveness of specific combinations of strategies would allow for an understanding of the impact that certain combinations may have on antihypertensive medication management. Routines comprised of specific strategies may be more prone to failure for older adults managing their antihypertensive medication than other routines. Investigating the use of various strategy combinations by older

adults and how these strategy combinations correlate with medication adherence rates would improve our understanding of which strategies, when used together, generally lead to more successful antihypertensive medication management. This information may then inform the development of interventions designed for improving the management of antihypertensive medication by allowing for recommendations to participants to use strategy combinations found to generally be more effective.

Despite over two-thirds of participants expressing that they sometimes forget to take their antihypertensive medication, all stated that they believed their routines, and the strategies that comprised them, were sufficiently effective. Additionally, the older adults believed that they would continue to use these routines, which were found to be primarily self-generated and unmodified over time, as they aged. When asked why this was, they attributed this desire to the overall success they perceived to have had with them. Essentially, participants may not feel a need to change something that they perceived worked just fine. Thus, it appears that, despite facing occasional adherence issues, participants didn't necessarily think that their routines were the issue.

The incongruity presented here between expressed issues with adherence and perceived effectiveness of the strategies they were using to manage their medication, represents one possible influence on why older adults, in general, may be struggling with successfully and consistently taking their prescribed antihypertensive medication. Despite expressing they are having issues with staying consistent with their medication management, they *feel* as if they are using effective methods. One possible contributor to this belief may be related to the asymptomatic nature of hypertension. As there are few, if any, indicators that an older adult is not properly taking their prescribed antihypertensive medication because of the disease's asymptomatic nature, they are relying on their own subjective evaluation of their abilities. If these evaluations are incorrect, it

may be difficult to fully understand that they are having medication management issues. One solution to this potential problem would be the integration of more objective results regarding whether their medication was successfully taken, such as using technologies able to collect unbiased adherence data and report it directly to the older adult in a clear and concise manner. This would remove their subjective appraisal of their success and facilitate self-corrective behaviors.

5.1.2 Older Adults' Knowledge of Hypertension

Asking participants what they knew regarding hypertension and what they believed to be important regarding living with the disease allowed for understanding whether the older adults in the study held misinformation or misconceptions that might influence their medication management strategies and related self-management behaviors. About one-fifth of the information participants shared was found to be inaccurate (19%; e.g., hypertension is caused by one's heartbeat) or improbable (2.4%; e.g., specific signs one experiences to know when their blood pressure is elevated). Overall, this highlights a problem regarding those diagnosed with hypertension accurately learning and retaining information about the disease and how to properly manage it. As the older adults in the current study exhibited, on average, more than adequate health literacy scores, suggesting they have the ability to process and understand health-related information, one potential contributor to these inaccuracies may be the source from which participants are getting their information.

Nearly two-thirds of the older adults in the current study expressed that they had learned about the disease from either their own research or from social sources such as their friends or family, while only one-third stated that what they learned about hypertension was from their physician or other healthcare professionals. Thus, misinformation may be spread through conversations or other sources such as web sites and news articles by those who incorrectly believe

they understand the disease. This highlights the need for physicians and other healthcare professionals to ensure their patients truly understand the characteristics of the disease, how to manage it successfully, and that supportive resources and materials are available for individuals diagnosed with hypertension to refer to, as one of the most effective tools to combatting misinformation is accurate, easily accessible information. Organized and well-sourced resources such as these may reduce the misconceptions commonly held by the participants. One such misconception was present regarding the generally asymptomatic nature of hypertension. When prompted to express what they knew about hypertension, only half of the participants mentioned that an individual usually does not know when their blood pressure is elevated. In addition, of the 19 participants that explicitly mentioned that the disease is asymptomatic, eight expressed that they, personally, experience symptoms from their hypertension, conflicting the previous expressed belief. If one is to properly manage their disease, it is imperative that they accurately understand the characteristics of the disease.

To fully understand the accuracy of an individual's knowledge pertaining to a disease like hypertension, a quantitative assessment designed to evaluate the extent of one's actual knowledge of the disease would enable a more effective analysis of commonly held gaps in information by older adults. For instance, the information a participant expressed when asked what they know may not necessarily reflect the true extent of what they have learned about the disease, but rather what they decided to share. Although this is a limitation of the qualitative approach in general, it is especially notable in this instance. In addition, there is a distinction between a symptom an individual perceives is related to their hypertension, and a sign that their blood pressure is elevated. A symptom is self-reported and not necessarily inaccurate. For instance, one may experience distinctive symptoms that result from experiencing a hypertensive crisis (e.g., headache). However, without the ability to objectively measure one's blood pressure to assess whether these

perceptions are signs that the individual's blood pressure is elevated, it is not possible to state that the individual is expressing inaccurate information despite hypertension's generally asymptomatic nature. This distinction is what led to the categorization of some participant's responses as improbable, yet not necessarily inaccurate. Nevertheless, what a person believes they know about hypertension will likely influence the actions they take to manage it, as well as how they internalize the disease.

5.1.3 Antihypertensive Medication Management and the Illness Representation Model

Older adults primarily attributed the cause of their hypertension to lifestyle factors in comparison to heredity. This reflected similar results found in a previous study of older adults with hypertension (Duwe et al., 2014). Further parsing the general lifestyle causes, the most common factors perceived contributing to their diagnosis were stress and diet, respectively. Essentially, it appears that the older adults in the current study internalized the cause of their hypertension as related to factors potentially within their control or ability to manage, in comparison to factors that may be out of their control such as their inherited genetic characteristics. Understanding the perceived causal factors of hypertension plays an important role in the management of their illness, as these perceptions may influence management behaviors to be directed primarily toward the behaviors that the individual believes to have played a role in their diagnosis. For instance, as in the current sample, if an older adult believes stress or diet to be specifically responsible for their hypertension, they may focus their attention on managing that factor rather than taking the steps necessary to control the disease in a well-rounded and appropriate manner (e.g., solely focusing on improving their diet rather than on the multiple factors necessary for hypertension control such as medication management, reducing stress, as well as improved diet).

Participants were asked about how much of a role they perceived hypertension as having in their lives, such as how it impacted their daily behaviors and decisions. This was done to understand the consequences they perceived relevant to living with the disease. As a chronic condition, which has the potential to lead to serious health-related outcomes if left untreated (e.g., heart disease, stroke), the management of hypertension should be an important area of focus for those diagnosed with it. However, most participants expressed that the disease played an insignificant role in their lives, and that they generally do not make decisions or do anything differently because of their diagnosis. Such a perspective may have contributed to why many participants expressed experiencing issues with adhering to their medication. That is, if one does not view the condition as significantly consequential or impactful, they may be less likely to attempt to ensure that their medication management routine is effective and consistent in their everyday lives, and reduce the effort put into ensuring they use effective methods to work toward proper adherence (e.g., less effective or fail-safe strategies). It is also possible that a lack of understanding or knowledge of the consequences of unmanaged hypertension may reduce the perceived seriousness of the disease, as avoiding these potential complications might motivate one to ensure they are always correctly managing their medication and implement behaviors, such as effective strategies, to work toward consistent adherence.

Factors relevant to the control component of the illness representation model potentially hold strong influence over an individual's management behaviors such as strategy use. If an older adult diagnosed with hypertension perceives the disease to be uncontrollable or unmanageable, they may be less inclined to follow the advice of their physician or consistently perform management behaviors such as using medication management strategies to adhere to their medication. Thus, the setting of explicit goals regarding the control of one's hypertension may motivate an individual to work toward mitigating the impact of the disease. Deficits in setting such

goals have been implicated in contributing to ineffective hypertension management by a sample of older, veteran men (Brown et al., 2007). We found that most participants expressed that they had not set any goals whatsoever regarding managing the disease, and only half had set medication-relevant goals. This supports the idea that lacking explicit goals regarding the management of hypertension might influence older adults' actions, thus reducing their motivations to consistently and properly keep their hypertension under control through the employment of effective strategies and consistent routines. It may be beneficial, then, for a healthcare professional to work with an older adult to set explicit goals, as well as realistic and relevant actions plans for reaching them, upon their diagnosis. Doing so may provide the motivation these individuals need to properly manage their condition, and tracking their progress toward reaching these goals would allow for feedback about their overall progress and help keep proper management, such as consistent medication adherence, at the forefront of their attention.

Regarding participants' perceived locus of control over their general health, their hypertension, and their antihypertensive medication management, older adults in the current study generally perceived an internal locus of control, expressing that they felt they possessed control over these areas. This was somewhat unexpected as previous findings have found that individuals may possess more external loci of control with increasing age (Lachman, 1986). In addition, this trend among participants to express an internal locus of control regarding their antihypertensive medication management in combination with the issues of adherence seemingly contradicts the findings by McDonald-Miszczak, Maki, and Gould (2000) regarding the relationship between internal locus of control and higher self-reported medication adherence. These findings leave open questions as to why the older adults in the current study felt as if they possessed control over their health, yet adherence issues were present and expressed by many participants. Similarly, nearly all participants expressed that they had high confidence in their ability to manage their medication. In

combination, these findings continue to support that these participants possess a misperceived sense of control over the management of their hypertension generally and their antihypertensive medication, specifically. If this is the case, having access to objective management-related statistics, such as daily blood pressure readings or adherence rates, would allow older adults to more accurately perceive their control over the disease and make proper adjustments in response to their progress (e.g., modifying the strategies they use to help them remember to take their medication).

Per the illness representation model, an individual's disease identity includes the symptoms that they perceive are related to the condition with which they have been diagnosed. Despite hypertension being a primarily asymptomatic disease, nearly 40% of the participants in the current study perceived experiencing symptoms that they attributed to their elevated blood pressure. These perceived symptoms, examples of which included fatigue, dizziness, and stress, represented a potentially incorrect internalization of the characteristics of hypertension by these older adults regarding the characteristics of the disease, and such misattributions might influence an older adult's self-management behaviors regarding whether they feel they need to take their medication and how they approach doing so (e.g., consistent use of certain strategies to ensure remembering). Again, although it is unlikely that these participants are accurately attributing these perceived symptoms as related to hypertension, some caution must be taken in stating that these perceptions are explicitly incorrect without more information (e.g., blood pressure readings).

In assessing the final component of the illness representation model, timeline, participants were asked to reflect upon the length of time they expected to need to manage the condition, both in general and regarding taking their prescribed antihypertensive medication. Older adults in the study expressed an expectation that they will have the disease for the rest of their life and always

need to manage their prescribed antihypertensive medication. However, over a quarter of participants expressed that they were unsure of how long they would need to continue taking their medication. As many older adults struggle to adhere to their antihypertensive medications, uncertainty about the role that management of the disease may play in their future could inhibit the actions they take toward proper management and reduce the importance of the medication to the individual. Thus, those diagnosed with the disease would benefit from a more thorough briefing about the relevance and expectations of treating their hypertension with the medications they have been prescribed, and this understanding might reinforce the importance of making sure that one adheres as directed by their physician.

On a related note, the older adults were asked about how long they have had hypertension to understand how long they have been tasked with managing the disease in general, as well as how significant of an event their diagnosis was to them personally. Most responses revealed that participants did not hold a particularly salient memory of the event of diagnosis, with many simply responding with a broad range of time in which they thought the initial diagnosis occurred. However, although these results might suggest that the diagnosis event may not have been significant to the individual, it is possible that lack of a specific length of time that one has had the disease could be related to general age-related memory declines experienced by the sample. For instance, some participants expressed having the disease for a significant amount of time (e.g., over 50 years), influencing their recall of specific details regarding the event

5.1.4 The Sample's Characteristics

One strength regarding the sample that participated in the study was the nearly equal distribution of participants regarding gender. As hypertension is a disease affecting individuals of both genders with a nearly equal occurrence rate in the United States (Ong, Tso, Lam, & Cheung,

2008), the expression of the topics of interest by both genders in a nearly equal frequency is beneficial in strengthening the generalizability of these results.

Another such strength involved the ethnic distribution, as the sample in the current study were found to primarily consist of white and African American individuals. This was mostly expected due to the demographics of the location in which the data was collected (Atlanta, Georgia). Although hypertension affects all ethnicities and races, there is evidence that African Americans have the highest incidence rate of the disease (Carson et al., 2011). However, as found by Carson and colleagues, this disparity is mostly non-existent between white and African American older adults over the age of 75. Thus, the age and ethnic distribution of the current sample may provide more generalizability to the information collected regarding hypertension management in the current study, reducing the concern of biases due to these variables.

Health literacy scores of the sample were, on average, quite high. The research regarding the influence of health literacy on hypertension control as well as medication management strategy use has been shown to be mixed (e.g., Kripalani et al., 2010; McNaughton, Jacobson, & Kripalani, 2014; Paasche-Orlow et al., 2006). As no correlational analyses were performed with this descriptive information, the results of the current study are not able to definitively support the potential for relationships between these factors. It is of note, however, that 80% of participants reported at least some post-high school educational experience, and that this elevated educational status may aid in explaining the elevated health literacy scores.

5.1.5 Limitations and Conclusions

The results of the current study provided a much-needed qualitative perspective on how older adults with hypertension approached the management of the disease, as well as the various perspectives and internalizations that may influence this approach. As antihypertensive medication

management continues to be a significant issue for older adults, advancing our understanding of the theoretical underpinnings of what might be contributing to the difficulties this population is experiencing regarding proper medication management is crucial in understanding how to improve their adherence rates. For instance, the prevalence of various misconceptions about the characteristics of the disease, as well as apparent incongruities between participants' perceived abilities and their self-reported adherence behaviors, point to the need for ensuring older adults are able acquire accurate information about hypertension. Objectively evaluating their medication management over time would allow for more effective approaches to controlling the disease and reducing the impact that older adults' subjective appraisals of their ability to manage this asymptomatic condition may have on their behavior. These findings also provide future directions for further investigation into the factors relevant to hypertension medication management specifically, and self-management generally.

In addition, the data collected in this study may also aid in the development of tools designed to improve adherence and provide consistent support for older adults with hypertension managing their antihypertensive medication. For example, the intervention study performed by Insel and colleagues (2016) showed that there is promise in the ability to improve adherence rates for older adults with hypertension. However, the benefits that participants experienced were not permanent, as adherence rates approached baseline rates shortly after the cessation of their participation in the intervention. Thus, talking to older adults about how they approach managing their medications, how they perceive the disease and its management, as well as their own abilities, may inform designers of such interventions to target areas most needing modification. For instance, finding commonalities related to gaps in knowledge about the disease that are prevalent among this population can allow for targeted and more effective knowledge components with such interventions. Another example might be assessing the prospective memory strategies older adults

are using, and the routines with which they form, and attempting to reinforce these strategies to help strengthen them against points of possible failures. This would help to ensure their effectiveness when older adults are confronted with common causes of nonadherence such as busyness leading to breaks in their routines, as was expressed by many participants in the current study.

On a similar note, this study's findings may inform the design of assistive technologies that could support proper disease education, consistent medication adherence, and help to combat prospective memory failures. An example of such a technology is a software application that allows older adults to not only receive professionally-sourced and consistently updated information about hypertension and its characteristics, but also provide the ability to track their medication management performance over time. In addition, the application could assist with reminding older adults to take their antihypertensive with salient reminders based upon users' notification preferences. Such software might impart similar benefits that the previous intervention provided (Insel et al., 2016), and may address the issues that potentially led to the regression toward baseline adherence rates (i.e., the intervention would be continuous).

Although the results of the current study have revealed data relevant to how older adults approach and internalize the management of their hypertension and prescribed antihypertensive medication, there are some limitations that must be addressed. One such limitation is the sample size of older adult participants. Although informative ideas were shared by 40 participants when exploring these topics, the generalizability of the results would improve with a larger sample to increase confidence that the ideas, opinions, and experiences shared in the current study are held among the general population and not due to participant characteristics or other related variables. For instance, it would be ideal to expand data collection across the United States and among

diverse communities to ensure that all perspectives and approaches are considered regarding antihypertensive medication management strategies and the relevant factors that may influence them.

A methodological limitation of the current study involved assessing participants' knowledge regarding their prescribed antihypertensive medication. To ensure that the older adults were effectively reflecting upon their medication management regimen, an information packet was mailed to them prior to their participation, to be filled out and brought in for use in the study session. Participants were able to reference this form during the interview, especially when discussing their medication management routines. However, providing this medication regimen information form influenced participants' answers to the questions regarding what they knew about their antihypertensive medications, as most of the responses reflected only what they had provided on the form itself. This inhibited our ability to assess what they knew about their medication in an unbiased way. Therefore, it would be beneficial for future research to attempt to understand the role that one's knowledge of their prescribed medication might play in influencing their approach to managing it.

Additionally, although qualitative data collection allows for the assessment of more detailed and personable information than one might be able to collect with most quantitative methods, there are benefits in broad quantitative data collection. For example, employing a battery including assessments for variables such as demographic variables (e.g., age, education), internalizations (i.e., components of one's illness representation) and other similar measurements might allow for improved understanding of the relative importance or weight of these variables in influencing adherence rates as well as strategy endorsement. Such an arrangement would further elucidate correlations between these individual difference variables and medication management

behaviors that would not be available with the sole use of a qualitative approach. Therefore, a mixed method approach combining the benefits of both avenues of data collection would further our understanding toward improving the medication management of older adults diagnosed with hypertension.

Moreover, a potential influence of medication management strategies that was omitted in the current study was that of cognitive ability. Although the current sample was screened for cognitive impairment to ensure their ability to fully participate in the study, cognitive ability has been found to play a significant role in medication adherence rates (Hayes et al., 2009). Therefore, there is potential that this factor plays an influential role in the management of a primarily asymptomatic disease such as hypertension, as well as holds the potential to influence some of the variables examined in the current study (e.g., reasons for forgetting to take medication, control beliefs). Thus, investigating the cognitive performance of older adults prescribed antihypertensive medication, such as executive functioning, working memory, among others, could yield useful information about how these abilities impact approaches to managing antihypertensive medication.

Quantitative measurements taken within one's home environment, such as with the use of smart home technologies and relevant smart devices, could provide more accurate and objective data regarding adherence rates and related behaviors (e.g., successful execution of one's medication management routine). The semi-structured interview allowed for participants to express their opinions and perceived abilities regarding medication management, which holds value for advancing theory related to these topics, but having the ability to ensure that participants are truly doing what they think they are doing can elucidate other topics of interest that may be

important in the design of tools to improve adherence. Thus, one should recognize the benefits of different methods and approaches of collecting information on this topic.

In conclusion, by designing and performing studies to address these limitations, we will further our understanding of the strategies and relevant routines used by older adults with hypertension to properly take their medication, as well as the variables that play an important role in the efficacy of these actions. Although the immediate goal of the current study was to understand these factors, the overarching goal of this work is to help improve older adults' abilities for successfully managing their hypertension, a highly common asymptomatic disease, and mitigate the impact that the disease has on their lives, resulting in improved functional independence and longer, healthier lives.

APPENDIX A.
MODIFIED TELEPHONE INTERVIEW FOR COGNITIVE STATUS (TICS-M)

		Score '1' for each correct answer and '0' if incorrect
Orientation		
1. (i) What day of the week is it?	Day	☐
(ii) What is today's date?	Date	☐
	Month	☐
	Year	☐
(iii) What season are we in?	Season	☐
2. What is your age?	Age:	☐
3. What is your telephone number? (Code + number)		☐
Registration/Free Recall		
4. I'm going to read you a list of 10 words.		
Please listen carefully and try to remember	Cabin	☐
them. When I am done, tell me as many as	Pipe	☐
you can in any order. Ready?	Elephant	☐
	Chest	☐
	Silk	☐
Now, tell me all the words you can remember	Theatre	☐
	Watch	☐
	Whip	☐
	Pillow	☐
	Giant	☐
Attention/Calculation		
5. Please take 7 away from 100	93	☐
Now continue to take 7 away from what	86	☐
you have left over until I ask you to stop.	79	☐
	72	☐
	65	☐
6. Please count backwards from 20 to 1	No mistakes	☐
Comprehension, Semantic and Recent Memory		
7. What do people usually use to cut paper?	Scissors	☐
8. What is the prickly green plant found in the desert?	Cactus	☐
9. Who is the reigning monarch now?	E, QE, QE2	☐
10. Who is the Prime Minister now?	Correct surname	☐
11. What is the opposite of east?	West	☐
Language/Repetition		
12. Please say this 'Methodist Episcopal'	Exactly right	☐
Delayed Recall		
13. Please repeat the list of 10 words I read earlier	Cabin	☐
	Pipe	☐
	Elephant	☐
	Chest	☐
	Silk	☐
	Theatre	☐
	Watch	☐
	Whip	☐
	Pillow	☐
	Giant	☐
		☐maximum of 39

APPENDIX B.
DEMOGRAPHIC AND BACKGROUND INFORMATION

1. Gender: ☐1 Male ☐2 Female

2. What is your date of birth? _____ (mm/dd/yyyy)

3. Are you fluent in English? ☐1 Yes ☐2 No

4. What is your preferred language for communicating?

☐1 English
☐2 Spanish
☐3 American Sign Language
☐4 Other (please list)_____

5. What is your highest level of education?

☐1 No formal education
☐2 Less than high school graduate
☐3 High school graduate/GED
☐4 Vocational training
☐5 Some or in-progress college/Associate's degree
☐6 Bachelor's degree (BA, BS)
☐7 Master's degree (or other post-graduate training)
☐8 Doctoral degree (PhD, MD, EdD, DDS, JD, etc)
☐9 Do not wish to answer

6. Current marital status (Check **one**)

☐1 Single
☐2 Married
☐3 Separated
☐4 Divorced
☐5 Widowed
☐6 Other (please specify) _____
☐7 Do not wish to answer

7. Do you consider yourself Hispanic or Latino?

☐1 Yes ☐2 No ☐3 Do not wish to answer

8. How would you describe your primary racial group?

☐1 American Indian/Alaska Native
☐2 Asian
☐3 Black or African American
☐4 Native Hawaiian or Other Pacific Islander
☐5 White
☐6 More than one race
☐7 Other (please specify) _____
☐8 Do not wish to answer

9. In which type of housing do you live?

☐1 Single family home
☐2 Apartment or Condominium
☐3 Assisted living residence
☐4 Nursing home residence
☐5 Other (please specify) _____
☐6 Do not wish to answer

10. Which one of the following BEST describes your living arrangement?

☐1 Living alone
☐2 Living with your immediate family (i.e., spouse/partner and/or dependent children, or parents if never married)
☐3 Living with your adult children
☐4 Living with your (or your spouse/partner's) extended family (e.g., parents, siblings, cousins)
☐5 Living with roommate(s)
☐6 Other (please specify) _____
☐7 Do not wish to answer

11. Is your housing or community specifically designed for seniors (i.e., 55 and older)?

☐1 Yes ☐2 No ☐3 Not sure

12. What is your primary mode of transportation? (Check **one**)

☐1 Drive myself
☐2 A friend or family member drives me
☐3 Walk
☐4 Bicycle
☐5 Taxi
☐6 Use transportation service provided by my residence
☐7 Use public transportation (e.g., bus, subway, van services)
☐8 Other (please specify) _____

13. Which category best describes your yearly household income? Do not give the dollar amount, just check the category.

☐1 Less than $25,000
☐2 $25,000 - $49,999

☐3 $50,000 - $74,999
☐4 $75,000 or more
☐5 Do not wish to answer
☐6 Do not know for certain

Occupational Status

14. What is your primary occupational status? (Check **one**)

☐1 Employed full-time

Occupation? _____

☐2 Employed part-time

Occupation? _____

☐3 Student

☐4 Homemaker

☐5 Retired

Former occupation? _____ Year retired? _____

☐6 On maternity leave, on sick leave, or on disability benefits

☐7 Unemployed or temporarily laid off
☐8 Other (please specify) _____

Health Information

1. In general, would you say your health is:

☐1	☐2	☐3	☐4	☐5
Poor	Fair	Good	Very good	Excellent

2. Compared to other people your own age, would you say your health is:

☐1	☐2	☐3	☐4	☐5
Poor	Fair	Good	Very good	Excellent

3. How satisfied are you with your present health?

☐1	☐2	☐3	☐4	☐5
Not at all satisfied	Not very satisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Extremely satisfied

4. How often do health problems stand in the way of your doing the things you want to do?

☐1	☐2	☐3	☐4	☐5
Never	Seldom	Sometimes	Often	Always

5. How much of the time has your health condition interfered with your social activities (like visiting with friends, relatives, etc.)?

☐1 ☐2 ☐3 ☐4 ☐5

Never Seldom Sometimes Often Always

6. How many different **prescription medications** do you take each day?

_____

7. How many different **over-the-counter medications/supplements** do you take each day?

_____

Please indicate if you have ever been told by a health professional that you have any of the following conditions. Check **one** box for each condition.

Condition	Yes1	No2	Do not wish to answer/ Not sure3
a. Alzheimer's Disease			
b. Arthritis			
c. Asthma			
d. Cancer			
e. Cardiac Atrial Fibrillation/ Cardiac Arrhythmia			
f. Chronic Kidney Disease			
g. Chronic Obstructive Pulmonary Disease (COPD)			
h. Coronary Artery Disease/ Coronary Heart Disease			
i. Depression			
j. Diabetes/High Blood Sugar			
k. Heart Failure/ Congestive Heart Failure			
l. High Blood Pressure/Hypertension			
m. High Cholesterol/Hyperlipidemia			
n. Osteoporosis			
o. Overweight			
p. Stroke/Transient Ischemic Attack			
q. Other? (If yes, please list below)			

Condition	Yes1	No2	Do not wish to answer/ Not sure3
_____ _____			

APPENDIX C.
MORISKY MEDICATION ADHERENCE SCALE (MMAS-8)

You indicated that you are taking medication for your high blood pressure (hypertension). Individuals have identified several issues regarding their medication-taking behavior and we are interested in your experiences. There is no right or wrong answer. Please answer each question based on your personal experiences with your antihypertensive medication. Interviewers may self-identify regarding difficulties they may experience concerning medication-taking behavior.

	No	**Yes**
1) Do you sometimes forget to take your antihypertensive drugs?	0	1
2) People sometimes miss taking their antihypertensive medications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your antihypertensive drugs?	0	1
3) Have you ever cut back or stopped taking medication without telling your doctor, because you felt worse when you took it?	0	1
4) When you travel or leave home, do you sometimes forget to bring along your antihypertensive medications?	0	1
5) Did you take your antihypertensive drugs yesterday?	0	1
6) When you feel like your hypertension is under control, do you sometimes stop taking your medicine?	0	1
7) Taking antihypertensive drugs every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your blood pressure treatment plan?	0	1
8) How often do you have difficulty remembering to take your antihypertensive drugs? **(Please circle the correct number)** Never/Rarely…….0 Once in a while…….……1 Sometimes…….... 2 Usually...……...3 All the time……...4		

APPENDIX D.
SHORT TEST OF FUNCTIONAL HEALTH LITERACY IN ADULTS (STOFHLA)

Short Test of Functional Literacy in Adults
STOFHLA
READING COMPREHENSION

HAND PATIENT THE READING COMPREHENSION PASSAGES TO BE COMPLETED. FOLD BACK THE PAGE OPPOSITE THE TEXT SO THAT THE PATIENT SEES ONLY THE TEXT.

PREFACE THE READING COMPREHENSION EXERCISE WITH:

> "Here are some other medical instructions that you or anybody might see around the hospital. These instructions are in sentences that have some of the words missing. Where a word is missing, a blank line is drawn, and 4 possible words that could go in the blank appear just below it. I want you to figure out which of those 4 words should go in the blank, which word makes the sentence make sense. When you think you know which one it is, circle the letter in front of that word, and go on to the next one. When you finish the page, turn the page and keep going until you finish all the pages."

STOP AT THE END OF 7 MINUTES

PASSAGE A: X-RAY PREPARATION

PASSAGE B: MEDICAID RIGHTS AND RESPONSIBILITIES

PASSAGE A

Your doctor has sent you to have a _____ X-ray.

a. stomach
b. diabetes
c. stitches
d. germs

You must have an _____ stomach when you come for _____.

a. asthma
b. empty
c. incest
d. anemia

a. is.
b. am.
c. if.
d. it.

The X-ray will _____ from 1 to 3 _____ to do.

a. take
b. view
c. talk
d. look

a. beds
b. brains
c. hours
d. diets

THE DAY BEFORE THE X-RAY.

For supper have only a _____ snack of fruit, _____ and jelly,

a. little	a. toes
b. broth	b. throat
c. attack	c. toast
d. nausea	d. thigh

with coffee or tea.

After _____ , you must not _____ or drink

a. minute,	a. easy
b. midnight,	b. ate
c. during,	c. drank
d. before,	d. eat

anything at _____ until after you have _____ the X-ray.

a. ill	a. are
b. all	b. has
c. each	c. had
d. any	d. was

THE DAY OF THE X-RAY.

Do not eat _____.

a. appointment.
b. walk-in.
c. breakfast.
d. clinic.

Do not _____ , even _____.

a. drive,	a. heart.
b. drink,	b. breath.
c. dress,	c. water.
d. dose,	d. cancer.

If you have any _____ , call the X-ray _____ at 616-4500.

a. answers,	a. Department
b. exercises,	b. Sprain
c. tracts,	c. Pharmacy
d. questions,	d. Toothache

PASSAGE B

I agree to give correct information to _____ if I can receive Medicaid.

a. hair
b. salt
c. see
d. ache

I _____ to provide the county information to _____ any

a. agree
b. probe
c. send
d. gain

a. hide
b. risk
c. discharge
d. prove

statements given in this _____ and hereby give permission to

a. emphysema
b. application
c. gallbladder
d. relationship

the _____ to get such proof. I _____ that for

a. inflammation
b. religion
c. iron
d. county

a. investigate
b. entertain
c. understand
d. establish

Medicaid I must report any _____ in my circumstances

a. changes
b. hormones
c. antacids
d. charges

within _____ (10) days of becoming _____ of the change.

a. three	a. award
b. one	b. aware
c. five	c. away
d. ten	d. await

I understand _____ if I DO NOT like the _____ made on my

a. thus	a. marital
b. this	b. occupation
c. that	c. adult
d. than	d. decision

case, I have the _____ to a fair hearing. I can _____ a

a. bright	a. request
b. left	b. refuse
c. wrong	c. fail
d. right	d. mend

hearing by writing or _____ the county where I applied.

a. counting
b. reading
c. calling
d. smelling

If you _____ TANF for any family _____ , you will have to

a. wash	a. member,
b. want	b. history,
c. cover	c. weight,
d. tape	d. seatbelt,

_____ a different application form. _____ , we will use

a. relax
b. break
c. inhale
d. sign

a. Since,
b. Whether,
c. However,
d. Because,

the _____ on this form to determine your _____ .

a. lung
b. date
c. meal
d. pelvic

a. hypoglycemia.
b. eligibility.
c. osteoporosis.
d. schizophrenia.

APPENDIX E.
MEDICATION MANAGEMENT STRATEGY QUESTIONNAIRE

1. Do you use any strategies to remember to take your blood pressure medication?

YES **NO**

2. **If you answered yes to the previous question,** which of the following strategies do you use? If you use a strategy that is not listed, please fill in the corresponding information at the bottom of the table, which includes the name that you would assign to the strategy, a brief description, how often you use it, and how effective you perceive it to be.

Strategies	Description
Association	This method relies on using an activity or event to help you remember to take medical products. For example, you take your medication every time you eat breakfast. Or you watch a certain TV show, brush your teeth, or drink a glass of water every time you take your medication.
How often do you use the above strategy? 1 Never 2 Rarely 3 Sometimes 4 Often 5 Always **How effective do you consider the above strategy?** 1 Not very effective 2 Slightly effective 3 Somewhat effective 4 Mostly effective 5 Very effective	
External Reminders	This method uses physical reminders to remind you to take your medical products. For example, you may set a wristwatch alarm to go off when it is time to take a medication. Or you may place a sticky note on the bathroom mirror to remind you to take a medication before bed. NOTE: You should not base responses for this section on your use of pill caddies.
How often do you use the above strategy? 1 Never 2 Rarely 3 Sometimes 4 Often 5 Always **How effective do you consider the above strategy?** 1 Not very effective 2 Slightly effective 3 Somewhat effective 4 Mostly effective 5 Very effective	

Location	For this method medication is kept in a consistent location that may or may not be visible. The location is used to help you remember to take your medication. For example, you may always keep your medical products in the kitchen pantry, in a medicine cabinet, or in a medicine bag. Note: Pill caddy does not count as a location. BUT, if you keep the pill caddy itself in a certain location to help you remember to take medication correctly, please indicate this strategy.

How often do you use the above strategy?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

How effective do you consider the above strategy?

1	2	3	4	5
Not very effective	Slightly effective	Somewhat effective	Mostly effective	Very effective

Mental Planning	This method involves thinking ahead about when you will take your medical product(s). For example, in the morning, you may plan when the medication should be taken during that day. OR, throughout the day, you many mentally repeat to remember the medication(s). The planning makes it easier to remember to take the medication during the day.

How often do you use the above strategy?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

How effective do you consider the above strategy?

1	2	3	4	5
Not very effective	Slightly effective	Somewhat effective	Mostly effective	Very effective

Physical Discomfort	This method uses how you physically feel. For example, you do not think about your medication unless you feel pain or physical discomfort.

How often do you use the above strategy?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

How effective do you consider the above strategy?

1	2	3	4	5
Not very effective	Slightly effective	Somewhat effective	Mostly effective	Very effective

Pill Organizer	This method uses a pill organizer to help remember to take medical products correctly. A pill organizer is a medication organizer or any other device used to store medications (not in their original bottles).

How often do you use the above strategy?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

How effective do you consider the above strategy?

1	2	3	4	5
Not very effective	Slightly effective	Somewhat effective	Mostly effective	Very effective

Social Reminders	This method involves the use of social reminders to remind you to take your medical products. For example, a family member, friend, physician, or other person may contact you in-person or via telephone to remind you to take your medication.

How often do you use the above strategy?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

How effective do you consider the above strategy?

1	2	3	4	5
Not very effective	Slightly effective	Somewhat effective	Mostly effective	Very effective

Visibility	This method uses placing medical products in a highly visible place. This is so you will notice the medications and be reminded to take them. For example, you may place your medications on top of a night stand, in the middle of the kitchen table, or next to a dinner plate.

How often do you use the above strategy?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

How effective do you consider the above strategy?

1	2	3	4	5
Not very effective	Slightly effective	Somewhat effective	Mostly effective	Very effective

Strategies	General Description

How often do you use the above strategy?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

How effective do you consider the above strategy?

1	2	3	4	5
Not very effective	Slightly effective	Somewhat effective	Mostly effective	Very effective

How often do you use the above strategy?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

How effective do you consider the above strategy?

1	2	3	4	5
Not very effective	Slightly effective	Somewhat effective	Mostly effective	Very effective

Strategies	General Description

How often do you use the above strategy?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

How effective do you consider the above strategy?

1	2	3	4	5
Not very effective	Slightly effective	Somewhat effective	Mostly effective	Very effective

APPENDIX F.
ANTIHYPERTENSIVE MEDICATION MANAGEMENT INTERVIEW SCRIPT

Italics = actions, items or reminders (not to be said to the participants)
Bold = to be said to the participants

Protocol Materials

- *Consent form*
- *Audio recorder*
- *Interview script*
- *Set of questionnaires (Demographic and Background Information Questionnaire, Morisky Medication Adherence Scale, STOFHLA, Medication Management Strategy Questionnaire)*
- *Debriefing form*
- *Pens/pencils*
- *Water*
- *Checks to pay participants*

Lay out all protocol materials on the table, in the appropriate order

Greet Participants

- *Meet participants in Human Factors & Aging Laboratory of J.S. Coon building on Georgia Tech campus*
- *Ensure door is open, you are ready to meet the participant when they arrive, and that you are paying attention so the participant is not waiting to be met*
- *Ask participants if they would like to use the restroom or drink some water before the experiment begins*

General Introduction

Thank you for participating in our study. Before we get started I would like you to please turn off your cell phone to ensure that there aren't any interruptions.

Wait for participant to turn off phone, and thank them for doing so.

My name is _____ and I'll be assisting with today's interview. Today's session should last about two hours and is divided into three parts.

- **Part I will take about 20 minutes. You are asked to complete three different questionnaires. You may use pen or pencil to answer these questions.**
- **Part II involves an interview and will take about one hour. We will discuss various questions related to managing the medication you have been prescribed for your**

high blood pressure. Once the interview is finished, you may take a short break if you so desire.

- **Part III involves another questionnaire and will take about 10 minutes.**

This is the consent form. Please read it carefully so you have a basic understanding about this research study. You can sign your name and the date at the end of the form.

- *Give participants the consent form and a pen/pencil*
- *Collect form when they finish*

Do you have any questions for the study before we start?

- *If yes, answer*
- *If no, continue*

Part I

- **We're about to begin the first part of the research study which involves three separate questionnaires. The first questionnaire asks questions related to basic demographic and background information such as age, ethnicity, health status, among others.**
  - *Give participant the demographic and background information questionnaire. Collect the questionnaire once they are finished and ensure that all questions have been answered. If any questions have been skipped, ask the participant about whether the question was skipped intentionally. If it wasn't, ask them to complete the question(s).*
- **Alright, you are now going to complete a measure that assesses one's ability to understand health-related information. You will be presented with two passages that contain incomplete sentences. For each blank, four options are provided and you are to choose the word that best fits the sentence. You will have seven minutes to complete both sections, and I will let you know when the time is up.**
  - *Give participant the* Short Test of Functional Health Literacy in Adults *(STOFHLA). Collect the questionnaire once they are finished or the time has expired, whichever occurs first.*
- **Thank you. The next questionnaire is a short assessment which asks questions related to taking your antihypertensive medication, which is the medication you were prescribed to help lower and control your blood pressure. Please read the instructions carefully and let me know if you have any questions before you begin.**
  - *Give participant the Morisky Medication Adherence Scale (MMAS-8). Collect the questionnaire once they are finished and ensure that all questions have been answered. If any questions have been skipped, ask the participant about whether the question was skipped intentionally. If it wasn't, ask them to complete the question(s).*
- **Thanks! We've now completed the first part of the study and will soon begin the next part.**

Part II

This part of the study involves an interview about how you approach the management of your blood pressure medication, and your answers to the following questions will be recorded. I am now going to start the recorder.

START RECORDER

Please take your time when answering these questions. There are no right or wrong answers so please feel free to express your opinion to the best of your ability and as accurately as possible. Following this part of the study, a short break may be taken if you would like one. We are now going to begin the interview. For reference, please refer to the medication list you brought with you and think about your blood pressure medication.

Begin asking the following questions. Ensure that the participants properly and fully answer the questions. If not, you may ask probing questions to attempt to get more information. Make sure that when trying to get more information, you do not bias the participants in any way or lead them to answer in any way other than their own opinion. Such questions make include:

- *You said X. What did you mean by this?*
- *Could you expand on what you meant by X?*
- *Would you mind telling me more about that?*
- *Etc.*

1. The point of today's discussion is to talk about your experience with managing your health. We will eventually focus on your high blood pressure, but let's start by discussing your opinions related to your general health. Do you believe you have control over your general health?
    a. Do you do things that focus on managing your general health?
2. Have you set any goals regarding your overall health?
3. Now, let's focus on your experience with high blood pressure, also known as hypertension. My first question is very broad. What do you know about high blood pressure? Imagine you are explaining it to someone who has no idea about what it is. How would you explain it?
    a. How did you learn about hypertension?
        i. Any other places?
4. Imagine you are talking to someone who was just diagnosed with hypertension about the condition. What would you tell them about what it's like to have hypertension?
5. Have you ever noticed any symptoms related to your hypertension?
    a. If so, what are they?
    b. How about more generally? Are there symptoms associated with hypertension?
6. Alright, and how long have you had hypertension?
    a. Do you remember when you were first diagnosed with hypertension?
7. How long do you expect to have hypertension?

8. What do you think caused your hypertension?
9. I'm curious about the impact your hypertension has had on you and your experiences. How much of a role does having hypertension play in your life?
    a. How does having hypertension affect you? For instance, do you make any decisions or do anything that differently because of your hypertension?
10. Do you believe you have control over your hypertension?
11. Have you set any goals regarding the management of your hypertension?
    a. *If so:* What are they?
        i. Are there any others?
    b. *If not:* why not?
12. Now, I would like to talk a bit about your blood pressure medications. Can you tell me what medications you currently take for your hypertension? *Refer to medication list if necessary.*
    a. What do you know about these medications?
    b. Have you always taken these medications?
        i. If not, why did you switch?
13. When are you supposed to take your prescribed blood pressure medication?
    a. Are there any other instructions for taking them?
14. When you take your blood pressure medications, do you experience any side-effects from taking them?
    a. *If yes:* what are they?
        i. Are there any others?
        ii. Do these side effects happen every time you take the medication?
15. How long do you expect to need to take your blood pressure medications?
    a. Why do you expect to need to take your medication for that amount of time?
16. For the next question, I'm wondering about how you view your blood pressure medication. Is it important to you that you take your blood pressure medications as prescribed?
    a. *If important:* Why do feel that taking your medication is an important thing to do?
    b. *If not important:* Why is taking your blood medication not that important to you?
17. Do you believe you have control over your blood pressure medication?

18. Overall, would you say that you feel confident about your ability to take your blood pressure medication correctly?
    a. Why do you think you feel this way?

19. Have you set any goals regarding taking your blood pressure medication?
    a. *If so:* What are they?
        i. Are there any others?
    b. *If not:* why not?

20. Do you sometimes forget to take your blood pressure medication?
    a. If yes: can you recall any specific situations or events that cause you to forget to take your medication?
        i. Are there any others?
        ii. Why do you think you sometimes forget to take your blood pressure medication at these times?
    b. If no: why do you think you always remember to take your blood pressure medication?

21. Let's think about some different situations that might influence your ability to take your medication at the right time. First off, imagine that you are travelling and are away from home.
    a. Do you ever have any issues remembering to take your blood pressure medication if something like this occurs?
        i. *If yes:* why do you think this is?
        ii. *If no:* what do you do to remember to take your medication in this scenario?

22. Now imagine that you have visitors at your home or are caring for others.
    a. Do you ever have issues remembering to take your blood pressure medication if something like this occurs?
        i. *If yes:* why do you think this is?
        ii. *If no:* what do you do to remember to take your medication in this scenario?

23. Are there any other situations or reasons in which you forget to take your blood pressure medications?

24. What do you think are the consequences of forgetting to take your blood pressure medication?

25. Do you do anything specific to remember to take your blood pressure medication?
    a. *If yes:* how do you remember to take your blood pressure medication? What is your method?
        i. What led you to use this approach? In other words, did you decide to do this on your own or did you learn to do this from someone else?
        ii. Do you feel that approach works well for you? Why or why not?
        iii. Have you always used this approach? If not, what did you used to do?
            1. What led to the change?
        iv. Do you expect that you will continue to use this method as you get older?
            1. *If yes:* Why do you think this would be the case?
            2. *If no:* Why do you think you would need to change this method?
    b. *If no:* why not?
26. Okay, now, for our last questions, we are going to get general again. Let's look at your list of medications. Could you tell me, overall, how you manage to coordinate taking everything?
    a. Do you ever have any problems managing all of your medications correctly?
27. Is there anything else you would like to add about what we discussed today?

Thank you for all of your input. We've now completed the interview portion of the study.

STOP RECORDER

There is one part of the study remaining which includes a single questionnaire. Would you like to take a break before completing it?

If the participant would like a break, 5-10 minutes may be allotted for them to use the restroom or get a drink of water. Once this time has passed, continue on to the final part of the study.

Break (if desired)

Part III

The final part of the study involves a questionnaire that assesses the specific strategies you use to manage your blood pressure medication and how effective you perceive these strategies to be. Please read the directions very carefully, as well as the descriptions of the strategies. Answer as honestly and accurately as possible, and let me know if you have any questions whatsoever.

- *Give participant the Medication Management Strategy Questionnaire. Collect the questionnaire once they are finished and ensure that all questions have been answered. If any questions have been skipped, ask the participant about whether the question was skipped intentionally. If it wasn't, ask them to complete the question(s). Also, ensure that the questionnaire and its ratings/scales have been filled out properly. If issues are found, attempt to make sure that the participant provides the correct information.*

Conclusion

We have now completed the final part of the study. Thank you so much for your participation! Before you leave, there are a couple of items that I'd like to give you, including the compensation for your time.

- *Give participants the check. Make sure they sign the correct receipt by checking that the check and receipt numbers match.*
- *Provide the debriefing form.*

Do you have any other questions about the study?

Answer any questions the participant may have.

Thanks again for participating!

Ensure the participant is able to leave the lab and knows where they should go.

APPENDIX G. MEDICATION REGIMEN INFORMATION PACKET

Medication Usage Details

Please list all medical products that you have been prescribed. This information will
be completely confidential.

1. Name of Medication:

_____

Reason for taking: _____ Dosage (ea. time taken):

_____ How often do you take the medication? (circle one)

Daily Every other day Weekly As needed

On days that you take the medication, how many times per day do you take it? _____

What time of day do you take the medication?

_____

How long you have been taking medication?

_____

Does this medication cause any problems?

_____

2. Name of Medication:

_____

Reason for taking: _____ Dosage (ea. time taken):

_____ How often do you take the medication? (circle one)

Daily Every other day Weekly As needed

On days that you take the medication, how many times per day do you take it? _____

What time of day do you take the medication?

_____

How long you have been taking medication?

_____

Does this medication cause any problems?

_____

3. Name of Medication:

_____

Reason for taking: _____ Dosage (ea. time taken):

_____ How often do you take the medication? (circle one)

Daily Every other day Weekly As needed

On days that you take the medication, how many times per day do you take it? _____

What time of day do you take the medication?

_____

How long you have been taking medication?

_____

Does this medication cause any problems?

_____

4. Name of Medication:

_____

Reason for taking: _____ Dosage (ea. time taken):

_____ How often do you take the medication? (circle one)

Daily Every other day Weekly As needed

On days that you take the medication, how many times per day do you take it? _____

What time of day do you take the medication?

_____

How long you have been taking medication?

_____

Does this medication cause any problems?

_____

5. Name of Medication:

_____

Reason for taking: _____ Dosage (ea. time taken):

_____ How often do you take the medication? (circle one)

Daily Every other day Weekly As needed

On days that you take the medication, how many times per day do you take it? _____

What time of day do you take the medication?

_____

How long you have been taking medication?

_____

Does this medication cause any problems?

_____

6. Name of Medication:

_____

Reason for taking: _____ Dosage (ea. time taken):

_____ How often do you take the medication? (circle one)

Daily Every other day Weekly As needed

On days that you take the medication, how many times per day do you take it? _____

What time of day do you take the medication?

_____

How long you have been taking medication?

_____

Does this medication cause any problems?

_____

7. Name of Medication:

_____

Reason for taking: _____ Dosage (ea. time taken):

_____ How often do you take the medication? (circle one)

Daily Every other day Weekly As needed

On days that you take the medication, how many times per day do you take it? _____

What time of day do you take the medication?

_____

How long you have been taking medication?

_____

Does this medication cause any problems?

_____

8. Name of Medication:

_____

Reason for taking: _____ Dosage (ea. time taken):

_____ How often do you take the medication? (circle one)

Daily Every other day Weekly As needed

On days that you take the medication, how many times per day do you take it? _____

What time of day do you take the medication?

_____

How long you have been taking medication?

_____

Does this medication cause any problems?

_____

9. Name of Medication:

_____

Reason for taking: _____ Dosage (ea. time taken):

_____ How often do you take the medication? (circle one)

Daily Every other day Weekly As needed

On days that you take the medication, how many times per day do you take it? _____

What time of day do you take the medication?

_____

How long you have been taking medication?

_____

Does this medication cause any problems?

_____

APPENDIX H.
CODING SCHEME AND OVERALL FREQUENCIES

Adherence and Related Characteristics

Category	Subcategory	Frequency (%)	Definition	Example Quote
Perceived Occurrence of Nonadherence to Antihypertensive Medication	Yes	27 (67.5%)	The participant expressed that they are sometimes nonadherent to their antihypertensive medication.	"I have forgotten to take it."
	No	12 (30.0%)	The participant expressed that they are always adherent to their antihypertensive medication.	"No... I don't forget to take it."
	Uncertain	1 (2.5%)	The participant expressed that they are uncertain about whether they always take their antihypertensive medication.	"I have no idea [if I've forgotten to take it]."
Reasons for Nonadherence	Busyness/Break in Routine	22 (52.4%)	The participant expressed that being busy led to issues with taking their antihypertensive medication.	"I just didn't do my daily routine in the bathroom."
	Travel	8 (19.0%)	The participant expressed that travelling has led to issues with taking their antihypertensive medication.	"I went on a trip once and forgot the medication, left it at home"
	General Forgetting	3 (7.1%)	The participant expressed that they simply forget to take their antihypertensive medication.	"Nothing that led me to forget. I just forgot."
	Running Out of Medication	3 (7.1%)	The participant expressed that running out of medication has led to issues with taking their antihypertensive medication.	"I forget...when I run out of medication."
	Social Influences (e.g., visitors)	3 (7.1%)	The participant expressed that social influences (e.g., having visitors) has led to issues with taking their antihypertensive medication.	"Well, like if I have the grandchildren over and then we're rushing in the morning to do something."
	Disorganization Due to Increasing Age	1 (2.4%)	The participant expressed that disorganization due to aging has led to issues with taking their antihypertensive medication.	"Because I have become more disorganized now that I am older, and that is part of it."

	Falling Asleep before Taking Medication	1 (2.4%)	The participant expressed that falling asleep prior to taking one's medication has led to issues with taking their antihypertensive medication.	"Since I started taking it at night, if I fall asleep..."
	Unsure	1 (2.4%)	The participant expressed that they were unsure what has led to issues with taking their antihypertensive medication.	"I have no idea...I may have gotten involved in something else."
Reasons for Adherence	Routine	10 (83.3%)	The participant expressed that they are always adherent to their antihypertensive medication because of the consistent use of their routine.	"It's a routine, and I figure that my body needs what it has to offer."
	Motivated by Overall Importance of Proper Medication Adherence	2 (16.7%)	The participant expressed that they are always adherent to their antihypertensive medication because of they were motivated by the overall importance of proper medication adherence.	"Because I realize how important it is. I need it and I'm in control of my life and my good health to go see the doctor, duh, duh, duh, ask him questions or ask the pharmacist, stay on top of your vaccines. And I do all that."
Perceived Consequences of Nonadherence	Significant consequences of long-term nonadherence	37 (47.4%)	The participant expressed that there would be significant consequences due to nonadherence to their antihypertensive medication in the long-term (e.g., multiple weeks or months of missed doses).	"Long-term...could lead to some significant consequences. ...Serious, if you... Yeah, serious consequences.
	Insignificant consequences of short-term nonadherence	29 (37.2%)	The participant expressed that there would be insignificant consequences due to nonadherence to their antihypertensive medication in the short-term (e.g., one to multiple consecutive doses).	"One dose, probably doesn't matter."
	Significant consequences of short-term nonadherence	10 (12.8%)	The participant expressed that there would be significant consequences due to nonadherence to their antihypertensive medication in the short-term (e.g., one to multiple consecutive doses).	"I think the short term would be various debilitating effects, which we've already touched on. And secondly, it could be a stroke or heart attack."

	Uncertainty about Consequences of Long-Term Nonadherence	2 (2.6%)	The participant expressed that they were unsure what the consequences would be of nonadherence in the long-term (e.g., multiple weeks or months of missed doses).	"Not really sure what the [long-term] consequences would be...yeah."
Experience with Current Antihypertensive Medication	Always Prescribed Current Antihypertensive Medication	17 (40.5%)	The participant has always taken their currently prescribed antihypertensive medication.	"Oh yes. That's the only one that I've taken, and the dosage has always been the same."
	Switched Medications Due to Side-Effects	10 (23.8%)	The participant switched their medication due to experienced side-effects.	... I had to come off of it because of some side effects."
	Switched Medications Due to Physician's Recommendation	5 (11.9%)	The participant switched their medication due to a recommendation by their physician.	"The doctor made the decision to switch..."
	Switched Medications Due to Cost	3 (7.1%)	The participant switched their medication due to the cost of the medication (e.g., switched to generic brand).	"Cost."
	Medications Added to Aid in Lowering Pressure	3 (7.1%)	The participant was prescribed additional antihypertensive medication to help lower their blood pressure.	"Yeah, they were added. I think if I remember correctly..."
	Switched Medications Due to Ineffectiveness	2 (4.8%)	The participant switched their medication due to a lack of positive outcomes.	"...we didn't see that much of a change, so she said, 'No. Let's try it with the HCTZ,' because she mentioned that in African-Americans, we tend to do better with this additional ingredient."
	Same Medications, Different Dosage	2 (4.8%)	The participant had their medication dosage increased to help lower their blood pressure.	"...since they reduced the dosage, I was fine. Two days later I was just going great."
Perceived Importance of Proper Antihypertensive Medication Adherence	Expressed Importance	38 (97.4%)	The participant expressed that taking their medication as prescribed is something they perceive as important to them.	"Yeah, if you're gonna take it, you might as well take it as prescribed."

	Expressed Unimportance	1 (2.6%)	The participant expressed that taking their medication as prescribed is something they perceive as not important to them.	"...wouldn't say it's that important...No."
Reasons for Importance of Proper Antihypertensive Medication Adherence	Continue to Experience Positive Outcomes of Med	15 (38.5%)	The participant expressed that it was important for them to take their medication because they wanted to continue to experience the medication's positive outcomes.	"Well, right now everything is under control, I wanna keep it that way."
	Avoid Consequences of the Disease	12 (30.8%)	The participant expressed that it was important for them to take their medication because they wanted to avoid the potential consequences of uncontrolled hypertension.	"Because I've heard of people who stopped taking and they've had strokes."
	Importance of Listening to Physician	10 (25.6%)	The participant expressed that it was important for them to take their medication because they felt it was important to listen to, and follow, their physician's orders.	"I don't think the doctor would give it to me if she didn't think it was important...Yeah. So that is why I feel it's important. If it is important, then that's what I do."
	Alleviate Worrying/Stress about the Disease	1 (2.6%)	The participant expressed that it was important for them to take their medication because they wanted to avoid worrying or stress related to having the disease.	"I feel very secure knowing that it's in my system...Less worry."
	Unsure	1 (2.6%)	The participant expressed that they did not know why they felt it was important for them to take their medication as prescribed.	"I don't know...It just is."
Experienced Side-effects of Current Medication	No Medication Side-effects	37 (94.9%)	The participant has not experienced side-effects from their current antihypertensive medication.	"Ah no. Yeah, I can't feel anything from it."
	Medication Side-effects	2 (5.1%)	The participant has experienced side-effects from their current antihypertensive medication.	"That's the major problem...swelling...I'm sure it's from the medication."
Perceived Impact of Medication Regimen Complexity on Adherence	Insignificant Impact	38 (97.4%)	The participant expressed that the complexity of their medication regimen (i.e., number of medications, complex ingestion instructions) has	"No. No problem with that."

			not had a significant impact on their medication management.	
	Significant Impact	1 (2.6%)	The participant expressed that the complexity of their medication regimen (i.e., number of medications, complex ingestion instructions) has had a significant impact on their medication management.	"Yeah...[I do have problems]."

Antihypertensive Medication Management Strategies

Category	Subcategory	Frequency (%)	Definition	Example Quote
Routine Usage	Yes	40 (100%)	The participant expressed that they do take specific actions to help them remember to take their antihypertensive medication.	"Yes, I do have a routine."
	No	0 (0%)	The participant expressed that they do not take specific actions to help them remember to take their antihypertensive medication.	N/A
Strategies Used in Participants' Routines	Association	31 (32.0%)	This method relies on using an activity or event to help you remember to take medical products. For example, you take your medication every time you eat breakfast. Or you watch a certain TV show, brush your teeth, or drink a glass of water every time you take your medication (Boron et al., 2013, p. 13).	"It's the association with me taking a shower."
	Location	23 (23.7%)	For this method medication is kept in a consistent location that may or may not be visible. The location is used to help you remember to take your medication. For example, you may always keep your medical products in the kitchen pantry, in a medicine	"I keep it in the kitchen in the cabinet."

		cabinet, or in a medicine bag. Note: Pill caddy does not count as a location. BUT, if you keep the pill caddy itself in a certain location to help you remember to take medication correctly, please indicate (Boron et al., 2013, p. 13).	
Visibility	17 (17.5%)	This method uses placing medical products in a highly visible place. This is so you will notice the medications and be reminded to take them. For example, you may place your medications on top of a night stand, in the middle of the kitchen table, or next to a dinner plate. NOTE: The visibility of this location is important, not the location, and must be explicit in the segment (Boron et al., 2013, p. 13).	"I keep them on my desk, because I have to go out and be on my computer every day, and I'm gonna be looking at those every day. Be reminded of them."
Pill Organizer	16 (16.5%)	This method uses a pill caddy to help remember to take medical products correctly. A pill caddy is a medication organizer or any other device used to store medications (not in their original bottles; Boron et al., 2013, p. 13).	"I have a seven-day pill box."
Mental Planning	8 (8.2%)	This method involves thinking ahead about when you will take your medical product(s). For example, in the morning, you may plan when the medication should be taken during that day. OR, throughout the day, you many mentally repeat to remember the medication(s). The planning makes it easier to remember to take the medication during the day (Boron et al., 2013, p. 13).	"Yeah, I mean, I guess you could call it a mental checklist, then right at the top there's, flashing, 'Take your medication, take your medication, take your medication,' and it's always there. I don't wake up some morning and have it not flashing."
Social Reminders	2 (2.1%)	This method uses social reminders to remind you to take your medical products. For example, a family member, friend, or healthcare	"Yeah…I go and get the medication for her and for me."

			provider may remind one to take their medication (modified from Boron et al., 2013, p. 13).	
	Physical Discomfort	0 (0%)	This method uses how you physically feel. For example, you do not think about your medication unless you feel pain or physical discomfort (Boron et al., 2013, p. 13).	N/A
	External Reminders	0 (0%)	This method uses physical reminders to remind you to take your medical products. For example, you may set a wristwatch alarm to go off when it is time to take a medication. Or you may place a sticky note on the bathroom mirror to remind you to take a medication before bed. NOTE: You should not base responses for this section on your use of pill caddies (Boron et al., 2013, p. 13).	

Antihypertensive Medication Management Strategy Characteristics

Category	Subcategory	Frequency (%)	Definition	Example Quote
Source of Routines	Personal	30 (75.0%)	The participant created their own antihypertensive medication management strategy routine.	"No, I came up with my own."
	Social	6 (15.0%)	The participant's antihypertensive medication management strategy routine was suggested by a family member, friend, or other social source.	"No... but I've seen all kinds of people that I've known that had pill organizers."
	Physician	2 (5.0%)	The participant's antihypertensive medication management strategy routine was suggested by a physician or other healthcare professional.	"[My doctor recommended] ...the organizer."
	Unsure	2 (5.0%)	The participant expressed that they were unsure about what led them to use their current antihypertensive	"I don't know [what led me to use my routine]."

			medication management strategy routine.	
Perceived Effectiveness of Routine	Effective	40 (100%)	The participant perceives their current antihypertensive medication management strategy routine as effective.	"It works well for me."
	Ineffective	0 (0%)	The participant perceives their current antihypertensive medication management strategy routine as ineffective.	N/A
Consistency of Current Routine Use Over Time	Consistent Use	30 (75.0%)	The participant has always used their current medication management strategies.	"Yeah, I don't think I remember any other approach that I've used."
	Previous Modification	8 (20.0%)	The participant has changed their medication management strategies over time.	"Well, no, 'cause I just started...about a year ago."
	Unsure	2 (5.0%)	The participant is unsure about whether they have always used their current routine.	"I don't even remember. I got to this."
Expectation of Using Same Routine in the Future	Yes	39 (97.5%)	The participant expects to always use their current medication management strategy routine as they age.	"Yeah, I'm trying to get older. [laughter]"
	No	1 (2.5%)	The participant does not expect to use their current medication management strategy routine as they age.	"No, 'cause eventually, I plan to get off of them."
Reasons for Expected Use of Same Routine with Age	Success of Routine	26 (65%)	The participant expects to use their current routine as they age because of the success they have had using it.	"It has just worked so well and I don't know any other method."
	Ease of Routine	6 (15%)	The participant expects to use their current routine as they age because of the ease of their routine.	"It's a no-brainer...You don't have to spend a lot of effort."
	No Reason to Change Routine	4 (10%)	The participant expects to use their current routine as they age because there is no reason to change it.	"Because I don't know any reason to change it."
	Unsure	4 (10%)	The participant is unsure of why they expect to use their current routine as they age.	"I really don't know [if I'll keep using it]."

Declarative Knowledge

Category	Subcategory	Frequency (%)	Definition	Example Quote
Expressed Knowledge Accuracy	Accurate	132 (78.6%)	The total number of statements made by participants that were found to be accurate, per the evaluation of a subject material expert.	"...I would say that the pressure of the blood is supposed to be at a certain level. And when it's higher than that, it puts a strain on the system. And that's not good for the system and the heart."
	Inaccurate	32 (19%)	The total number of statements made by participants that were found to be inaccurate, per the evaluation of a subject material expert.	"...it's pumping blood to the heart faster than it should be pumping."
	Improbable	4 (2.4%)	The total number of statements made by participants that were found to be most likely incorrect, but are possibly true. For instance, without objective measurements of an individual's blood pressure at the time they perceive a specific symptom, it is not possible to state that a perceived symptom is false.	"…get tired more easily. There can be shortness of breath with it."
Knowledge of Asymptomatic Nature	Mentioned Asymptomatic Nature	19 (47.5%)	The participants explicitly mentioned that they knew that hypertension was an asymptomatic disease.	"It's a silent killer. You can be going along about your everyday activities and not even know you have high blood pressure because it doesn't always reflect in your activities."
	Did Not Mention Asymptomatic Nature	21 (52.5%)	The participants did not explicitly mention that they knew that hypertension was an asymptomatic disease.	N/A
Expressed Knowledge of General Symptoms	Yes	23 (50%)	The participant mentioned that they knew of general symptoms that can be experienced by an individual with hypertension.	"Yeah, people get dizzy."
	Unsure	12 (30%)	The participant mentioned that they were not sure of the existence of general symptoms that can be experienced by an individual with hypertension.	"I'm not sure to answer that question...I don't know."

	No	5 (13.5%)	The participant mentioned that they did not know of general symptoms that can be experienced by an individual with hypertension.	"Not to my knowledge."
General Symptoms Mentioned	Dizziness	8 (20%)	The participant mentioned that dizziness is a symptom of hypertension that an individual may experience.	"Dizziness. Some people experience dizziness."
	Headaches	6 (15%)	The participant mentioned that headaches are a symptom of hypertension that an individual may experience.	"I hear a lot of people have severe headaches."
	Vision Issues	6 (15%)	The participant mentioned that vision-related issues are a symptom of hypertension that an individual may experience.	"They have problems with the eyes, stuff like that."
	Fatigue	6 (15%)	The participant mentioned that fatigue is a symptom of hypertension that an individual may experience.	"They might notice they're tired, they don't have the energy to get up and go that they used to have."
	Fainting	2 (5%)	The participant mentioned that fainting is a symptom of hypertension that an individual may experience.	"Well, I know some people can faint because of it."
	Lightheadedness	2 (5%)	The participant mentioned that lightheadedness is a symptom of hypertension that an individual may experience.	"...a lot of them say they feel lightheaded."
	General Feelings of Illness	2 (5%)	The participant mentioned that general feelings of illness are a symptom of hypertension that an individual may experience.	"...general not-well-being feeling."
	Increased Heart Rate	1 (2.5%)	The participant mentioned that increased heart rate is a symptom of hypertension that an individual may experience.	"Feel, the heart rate. You can feel, and this I have experienced, you're pumping..."
	Restlessness	1 (2.5%)	The participant mentioned that restlessness is a symptom of hypertension that an individual may experience.	"Fidgety, maybe."
	Agitation	1 (2.5%)	The participant mentioned that agitation is a symptom of	"...you're agitated. You have short... You get upset over nothing..."

			hypertension that an individual may experience.	
	Vertigo	1 (2.5%)	The participant mentioned that vertigo is a symptom of hypertension that an individual may experience.	"You feel like you're off-balance...vertigo."
	Disorientation	1 (2.5%)	The participant mentioned that disorientation is a symptom of hypertension that an individual may experience.	"...Disoriented."
	Sweating	1 (2.5%)	The participant mentioned that increased perspiration is a symptom of hypertension that an individual may experience.	"...all kinds of... Sweating..."
	Mental Issues	1 (2.5%)	The participant mentioned that mental issues are a symptom of hypertension that an individual may experience.	"It can cause mental problems, I understand that it can."
	Increased Urination	1 (2.5%)	The participant mentioned that increased urination is a symptom of hypertension that an individual may experience.	"Some people tell me they urinate more."
Source of Hypertension Knowledge	Physician	20 (35.7%)	The participant expressed that the source for their knowledge of hypertension was the participant's physician, such as through discussions about the disease when the participant was diagnosed or during follow-up appointments.	"From the doctor."
	Social	20 (35.7%)	The participant expressed that the source for their knowledge of hypertension was friends, family, or other social contacts of the participant.	"Oh, when I was a kid. Everybody was talking about it."
	Personal Acquisition	16 (28.6%)	The participant expressed that the source for their knowledge of hypertension was through personal research on the disease.	"... looking up on the internet."
	Importance of Managing Food Intake	14 (19.7%)	The participant mentioned that, when living with hypertension, it is important to manage what one eats.	"For me, it means I need to be mindful of what I eat."

Information to Know Regarding Living with Hypertension	Importance of Proper Medication Adherence	12 (16.9%)	The participant mentioned that, when living with hypertension, it is important to properly adhere to their antihypertensive medication.	"The key things here are to take your medication, because you want to control it."
	Consistent Focus on Management of Hypertension	9 (12.7%)	The participant mentioned that, when living with hypertension, one should consistently focus on managing the disease.	"You gotta keep it on your mind."
	Importance of Awareness of Hypertension's Asymptomatic Nature	8 (11.3%)	The participant mentioned that, when living with hypertension, it is important to know that the disease is asymptomatic.	"It's a silent killer..."
	Need to Control Anxiety/Stress	7 (9.9%)	The participant mentioned that, when living with hypertension, it is necessary to control one's anxiety and/or stress.	"Try to get your stress under control."
	Importance of Regular Exercise	5 (7.0%)	The participant mentioned that, when living with hypertension, it is important to exercise regularly.	"Exercise is very important, because I found that when I exercise, my blood pressure, instead of elevating, it gets lower."
	Importance of Listening to Physician's Advice	4 (5.6%)	The participant mentioned that, when living with hypertension, it is important to listen to the advice of one's physician.	"That it's your life and if you don't do what the doctor says, you're not gonna be here."
	Need to Check Blood Pressure Regularly	3 (4.2%)	The participant mentioned that, when living with hypertension, it is necessary to check one's blood pressure regularly.	"...check your blood pressure regularly."
	Important to Know about Symptoms	3 (4.2%)	The participant mentioned that, when living with hypertension, it is important to know about the potential symptoms of the disease.	"There can be shortness of breath with it. How do you know about... When you start walking up a flight of stairs and when you get to the top, your heart... You can feel you're really pounding."
	Importance of Weight Management	2 (2.8%)	The participant mentioned that, when living with hypertension, it is important to manage one's weight.	"By losing weight..."
	Importance of Proper Rest	2 (2.8%)	The participant mentioned that, when living with hypertension, it is	"Make sure you get enough rest."

			important to consistently get proper rest.	
	Avoidance of Drugs/Alcohol	1 (1.4%)	The participant mentioned that, when living with hypertension, it is necessary to avoid drugs and/or alcohol.	"Don't smoke, don't drink alcohol..."
	Unsure	1 (1.4%)	The participant mentioned that they were unsure what to mention regarding living with hypertension.	"I wouldn't really know [what to tell someone]."

Perceived Causes of Hypertension

Category	Subcategory	Frequency (%)	Definition	Example Quote
Perceived Cause of One's Hypertension	General Genetics	18 (31.6%)	The participant expressed that they believed that a genetic predisposition was the cause of their hypertension.	"Heredity, basically."
	Stress	14 (24.6%)	The participant expressed that they believed that stress was a cause of their hypertension.	"I think stress, emotional stress had something to do with it."
	Diet	11 (19.3%)	The participant expressed that they believed that their diet was a cause of their hypertension.	"...eating processed food, salt, processed salt, processed flour, white flour, processed sugar, junk food."
	Unsure	5 (8.8%)	The participant expressed that they were not sure what may have caused their hypertension.	"I really, I don't know, I don't know if it was genetics. I don't know if it was just a condition I develop for whatever reason, I don't have any idea."
	Weight	4 (7.0%)	The participant expressed that they believed that their weight was a cause of their hypertension.	"Well, maybe partly having on a little bit too much weight. I don't think I was ever fat. I was a little on the heavy side, heavier than I am now..."
	Side-effect of Prior Medication	1 (1.8%)	The participant expressed that they believed that a prior medication's side-effects were a cause of their hypertension.	"Yeah, because I never had a problem before...[taking that medication]."
	General Lifestyle	1 (1.8%)	The participant expressed that they believe their general lifestyle (i.e., the non-specific way they have lived their	"I would guess my lifestyle."

			life) was a cause of their hypertension.	
	Lack of Sleep	1 (1.8%)	The participant expressed that they believe that a lack of sleep was a cause of their hypertension.	"Lack of sleep."
	Lack of Exercise	1 (1.8%)	The participant expressed that they believe that a lack of exercise was a cause of their hypertension.	"Not exercising had a lot to do with it, yeah, yeah."
	Aging	1 (1.8%)	The participant expressed that they believe that aging was a cause of their hypertension.	"Just getting older. A lot of people my age have it..."

Perceived Consequences

Category	Subcategory	Frequency (%)	Definition	Example Quote
Perceived Significance of Hypertension in One's Life	Insignificant Role	30 (76.9%)	Participant expressed that hypertension plays an insignificant role in their life. For instance, one does not attempt to take actions relevant to its management and that hypertension does not play a role in daily decisions.	"No, I don't think it's significant."
	Significant Role	9 (23.1%)	The participant expressed that hypertension plays a significant role in their life. For instance, one consistently attempts to takes actions relevant to its management and that hypertension plays a role in daily decisions.	"Oh, no, it's significant. It's definitely significant."

Control: Goal Setting

Category	Subcategory	Frequency (%)	Definition	Example Quote
Participant Set General Health Goals	Yes	37 (92.5%)	The participant stated that they have set goals relevant to their general health.	"Yes, I've got to get this down, this gut."

	No	3 (7.5%)	The participant stated that they have not set goals relevant to their general health.	"No."
General Health Goals Mentioned	Lose Weight	17 (34%)	The participant explicitly mentioned a goal to lose weight.	"Trying to lose 20 pounds by the end of the year."
	Improve/Maintain Physical Fitness	13 (26%)	The participant explicitly mentioned a goal to improve or maintain their physical fitness over time.	"I am trying so hard to walk three miles. The last time I was at the walking track, I got two."
	Increase Lifespan	7 (14%)	The participant explicitly mentioned a goal relevant to increasing one's lifespan.	"Yes. I would like to live to be 100."
	Overall Improvement of Well-being	4 (8%)	The participant explicitly mentioned a goal to improve their overall subjective well-being.	"To be as healthy as I can. [chuckle] That's about the best I can set."
	Proper Medication Management	2 (4%)	The participant explicitly mentioned a goal to properly manage their prescribed medications.	"...to take my medicine like I'm supposed to."
	Maintain Current Health Status	2 (4%)	The participant explicitly mentioned a goal to maintain one's current health status over time.	"Yeah, to maintain it where it is right now."
	Reduce Stress/Anxiety	1 (2%)	The participant explicitly mentioned a goal to reduce their general stress or anxiety levels.	"I'm constantly trying to reduce stress. I have a very hard time with it.'
	Control the Impact of Hypertension	1 (2%)	The participant explicitly mentioned a goal to control the impact that hypertension has on their general health.	"Well, I would like to get rid of hypertension, but since I can't, I'll have to control it. The other goal is to keep from getting any other related illness that comes from hypertension, such as kidney failure... All those other things that could happen to you if you don't get your blood pressure under control."
	Avoid Falling	1 (2%)	The participant explicitly mentioned a goal to avoid falling.	"One of the things I'm cautious of is falling. That's a very common thing for seniors. I've slowed down deliberately, and I am more deliberate in what I do and where I do it and how I do it."

	Improve/Maintain Lifestyle	1 (2%)	The participant explicitly mentioned a goal to improve their wellness through specific lifestyle actions, or to maintain a desired or currently held lifestyle.	"The goal is that I have a grandson who is getting engaged and is going to be married within the next year, and apparently is going to be married in upstate New York. Nobody lives in upstate New York, but I'd like to be able to go."
	Reduce Care Burden	1 (2%)	The participant explicitly mentioned a goal regarding reducing one's personal or shared care burden (e.g., less personal, familial, or healthcare provider intervention).	"I do not want to end up living in a facility."
Participant Set Hypertension Goals	No	23 (57.5%)	The participant stated that they have not set goals relevant to managing their hypertension.	"No, I never thought about that."
	Yes	17 (42.5%)	The participant stated that they have set goals relevant to managing their hypertension.	"Yes, to get it under control..."
Hypertension Goals Mentioned	General Lifestyle Management (Diet, Exercise, Etc.)	6 (30.0%)	The participant mentioned a goal relevant to managing their hypertension involving successfully managing their lifestyle such as their diet or physical activity.	"...cut back on the salt, eat healthier."
	Maintain Current Management Routine	6 (30.0%)	The participant mentioned a goal relevant to managing their hypertension involving ensuring that they maintain their current management routine.	"Just to continue what I'm doing right now."
	Lower or Control Blood Pressure	5 (25.0%)	The participant mentioned a goal relevant to managing their hypertension involving the successful lowering and/or control of one's blood pressure to an acceptable or recommended level.	"I want it to level off...That's my only interest right now."
	Manage the Symptoms	1 (5.0%)	The participant mentioned a goal relevant to managing their hypertension involving successfully managing their perceived symptoms.	"Well, if I could eliminate the headaches when I have hypertension."

	Reduce the Chances of Related Diseases	1 (5.0%)	The participant mentioned a goal relevant to managing their hypertension involving reducing the odds of contracting diseases related to having chronic hypertension.	"I want to avoid having a stroke or other things from hypertension."
	Consistently Monitor Blood Pressure	1 (5.0%)	The participant mentioned a goal relevant to managing their hypertension involving consistently monitoring the disease.	"I constantly take these [blood pressure] tests...And I want to keep being very strict about it."
Participant Set Antihypertensive Medication Goals	Yes	23 (59.0%)	The participant stated that they have set goals related to managing their antihypertensive medication.	"Yeah. To stop taking it. That's my main primary goal, but that's it."
	No	16 (41.0%)	The participant stated that they have set goals related to managing their antihypertensive medication.	"No, I have not set any goals."
Antihypertensive Medication Goals Mentioned	Take Medication as Prescribed	15 (62.5%)	The participant expressed that they have set a goal involving taken one's medication as prescribed, such as on-time or consistently.	"Just take it every day like I've been doing since it is successful."
	Reduce Need for or Amount of Medication	9 (37.5%)	The participant expressed that they have set a goal regarding reducing the amount or the need to take antihypertensive medication.	"Yeah. To stop taking it. That's my main primary goal, but that's it."

Control: Locus of Control

Category	Subcategory	Frequency (%)	Definition	Example Quote
General Health Locus of Control	Internal	33 (82.5%)	The degree to which individuals believe they can control events affecting them. An internal locus of control is the belief that control over their general health is within their own control.	"I am the only person that controls my health. I am in control of me."
	Mixed	6 (15%)	The degree to which individuals believe they can control events affecting them. A mixed locus of control is the belief that control over their general health is due to both	"It's partial. Yeah… Sometimes I feel like I have control and sometimes I feel like it's out of my hands."

			internal control and external factors, and may vary over time.	
	External	1 (2.5%)	The degree to which individuals believe they can control events affecting them. An external locus of control is the belief that control over their general health is due to uncontrollable factors such as the environment, other people, or a higher power.	"I used to think I did, but as I age, I'm beginning to think that some of it is not as much under my control as I would like."
Hypertension Locus of Control	Internal	31 (77.5%)	The degree to which individuals believe they can control events affecting them. An internal locus of control regarding one's hypertension is the belief that control over their hypertension is within their own control.	"I believe it's the decisions that I make."
	Mixed	4 (10%)	The degree to which individuals believe they can control events affecting them. A mixed locus of control is the belief that control over their hypertension is due to both internal control and external factors, and may vary over time.	"I would say it's a mixture of control…Sometimes it's me, sometimes it's other things."
	External	3 (7.5%)	The degree to which individuals believe they can control events affecting them. An external locus of control regarding one's hypertension is the belief that control over their hypertension is due to uncontrollable factors such as the environment, other people, or a higher power.	"It (blood pressure) fluctuates. If I had control, it wouldn't fluctuate."
	Unsure	2 (5%)	The participant expressed that they were unsure about the locus of control regarding their hypertension.	"I don't know [if I have control]."
Antihypertensive Medication Locus of Control	Internal	36 (90%)	The degree to which individuals believe they can control events affecting them. An internal locus of control is the belief that control over	"Yeah. I have control over it."

			their antihypertensive medication is within their own control.	
	Mixed	3 (7.5%)	The degree to which individuals believe they can control events affecting them. A mixed locus of control is the belief that control over their antihypertensive medication is due to both internal control and external factors, and may vary over time.	"I think I have control but I don't think I have control all the time...It's not always up to me."
	External	1 (2.5%)	The degree to which individuals believe they can control events affecting them. An external locus of control is the belief that control over their antihypertensive medication is due to uncontrollable factors such as the environment, other people, or a higher power.	"No, I'm not the one in control."

Control: Self-Efficacy

Category	Subcategory	Frequency (%)	Definition	Example Quote
Medication Management Self-efficacy	High Self-efficacy	37 (94.9%)	The degree (of confidence) to which an individual positively believes in his/her capacity or ability to manage his/her blood pressure or medication.	"Yeah, I do. I have a system where I don't avoid it. I make sure I take it."
	Low Self-efficacy	2 (5.1%)	The degree (of confidence) to which an individual negatively believes in his/her capacity or ability to manage his/her blood pressure or medication.	"I could if I would... But the possibility of…being on a regular schedule is remote."
Reasons for Confidence	Using a Routine	20 (46.5%)	The participant feels confident about their ability to successfully take their antihypertensive medication because of their routine.	"Routine. It's been the way it's been working. It's worked fine so far. I'm taking it, it's working and..."
	Importance of Taking Medication	10 (23.3%)	The participant feels confident about their ability to successfully take their antihypertensive medication because they know how important it is to do so.	"Because basically I know how important it is. It's my one-a-day pill."

	General Confidence in One's Abilities	7 (16.3%)	The participant feels confident about their ability to successfully take their antihypertensive medication because they are generally confident in their personal abilities.	"Because I do [feel confident]."
	Overall Success in Taking Medication	5 (11.6%)	The participant feels confident about their ability to successfully take their antihypertensive medication because of the overall success they have had thus far.	"Well, it works... I'm getting satisfaction with it."
	High Perceived Health Literacy	1 (2.3%)	The participant feels confident about their ability to successfully take their antihypertensive medication because they are confident in their ability to understand and act upon health-related information.	"Well, I feel that I can read, and I feel that I understand it, and if I don't understand, I'm the person who asks 100 questions."

Identity: Perceived Symptoms

Category	Subcategory	Frequency (%)	Definition	Example Quote
Personal Hypertension Symptoms	No	24 (60%)	The participant mentioned that they do not experience symptoms of hypertension.	"Nope, there was nothing saying, 'You got something coming... Something in your body or something that's happening inside your body that says...' Well, no bells went off."
	Yes	15 (37.5%)	The participant mentioned that they experience symptoms of hypertension.	"Yeah...Dizziness..."
	Unsure	1 (2.5%)		"I'm not really sure…"
Specific Symptoms Experienced	Fatigue	5 (26.3%	The participant mentioned that they experience fatigue as a symptom of hypertension.	"Just feeling drained..."
	Dizziness	4 (21.1%)	The participant mentioned that they experience dizziness as a symptom of hypertension.	"I feel dizzy."
	Stress	3 (15.8%)	The participant mentioned that they experience stress as a symptom of hypertension.	"I get stressed when my blood pressure rises."

	Headaches	3 (15.8%)	The participant mentioned that they experience headaches as a symptom of hypertension.	"Sometimes I may experience headaches as a result of it."
	Difficulty Sleeping	1 (5.3%)	The participant mentioned that they have trouble sleeping as a symptom of hypertension.	"...Or not able to sleep."
	Swelling	1 (5.3%)	The participant mentioned that they experience swelling as a symptom of hypertension.	"Well, every now and then I have some swelling in my ankles."
	Shortness of Breath	1 (5.3%)	The participant mentioned that they experience shortness of breath as a symptom of hypertension.	"Yes...Shortness of breath."
	Increased Energy/Hyperactivity	1 (5.3%)	The participant mentioned that they experience increased energy/hyperactivity as a symptom of hypertension.	"I can be hyper..."

Timeline of Hypertension Management

Category	Subcategory	Frequency (%)	Definition	Example Quote
Length of Time with Hypertension	General Timeline	23 (57.5%)	The participant mentioned a general amount of time they have had hypertension, and expressed that they did not remember exactly when they were diagnosed.	"I'm not sure, probably on the order of 10-12 years. When I started, but I was still working then. After I retired, I didn't have so much. And I took my own blood pressure... It must be longer than that; maybe 15 or even 20 years."
	Specific Timeline	15 (37.5%)	The participant mentioned a specific amount of time they have had hypertension, and expressed that they remembered exactly when they were diagnosed.	"Starting at 25."
	Unsure	2 (5.0%)	The participant mentioned that they do not know how long they have had hypertension.	"Oh, wow... I really don't know."
Length of Time Expecting to Have Hypertension	Rest of Life	22 (55.0%)	The participant expressed that they expect to need to manage their hypertension for the rest of their life.	"I assume I'm gonna have it for the rest of my life."

	Expected Cessation	9 (22.5%)	The participant expressed that they expect to need to manage their hypertension for a limited amount of time.	"I expect an end date. I expect to lose the weight. I think the 20 pounds would make a big difference. I'm already doing the exercise. I already know how to eat right. I think that if I really, really enforce those things, I think that I could come off of it."
	Unsure	9 (22.5%)	The participant expressed that they do not know how long they will need to manage their hypertension.	"I've no idea. I don't know."
Length of Time One Expects to Need to Take Their Medication	Rest of Life	20 (50.0%)	The participant expressed that they expect to have to manage their antihypertensive medication for the rest of their life.	"For as long as I live."
	Unsure	12 (30.0%)	The participant expressed that they are unsure how long they will need to manage their antihypertensive medication.	"I have no idea..."
	Expected Cessation	8 (20.0%)	The participant expressed that they expect to have to manage antihypertensive medication for a limited amount of time.	"Hopefully, like I said, hopefully by December, I'm gonna be off."

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